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New Compositae from New Mexico.

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(PLATES 330–334.)

This paper embodies in brief some results of the critical study of a good collection of Compositae made in southeastern New Mexico in the summer of 1897; the special localities being the Sierra Blanca or White Mountain Range, the Organ Mountains, and the plains to the west of these ranges. The collector, Mr. E. O. Wooton, made a wise selection in choosing these little known parts of the vast territory of New Mexico as the field of a season's exploring.

I am not aware that, in the Sierra Blanca, any botanist has preceded him; and the ground being new, and, as a mountainous district, somewhat isolated from all other groups and ranges of New Mexican mountains, a considerable accession of new plants was to have been expected.

It will be noted, however, that the first of the forms here assigned specific rank, is not new, but heretofore has been imperfectly understood, and received as a mere variety of another species..

COLEOSANTHUS PETIOLARIS (Gray).

Resembling *C. grandiflorus*, but taller and loosely branching the inflorescence lax and leafy; stem and branches puberulent foliage nearly glabrous, pellucid-glandular, thin membranous, the leaf-outline hastate-deltoid, usually with a long acumination,

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the petioles slender, often nearly as long as the lamina: heads few and nodding in scattered small cymes: short oval and oblong outer bracts of the involucre obtuse, but caudate with a long slender herbaceous tip.

Organ Mountains, Sept. 1 (no. 490). I take this to be identical with *Brickellia grandiflora petiolaris* Gray, but its characters, as above indicated, are numerous. By the texture of its foliage, and the mode of growth, it is wholly distinct from *C. grandiflorus*. Its sufficiently well marked leaf-outline, and the slender petioles, pointed out by Gray, are of less importance than those characters which he did not detect. It is to be regretted that Mr. Wooton's specimens give no indication of what the lower parts of the plant are like, he having furnished us with only the terminal and flowering portion.

COLEOSANTHUS AMBIGENS.

Apparently herbaceous, 2° high or more, simple up to the rather strict and thyrsiform panicle of middle-sized heads; foliage green and seeming glabrous, but sparsely scabrous-puberulent under a lens: lowest leaves opposite, the pairs remote, very thin, deltoid-ovate, 2′ or 3′ long, acute, coarsely serrate-toothed, the upper and those subtending the branches of the panicle alternate, all with slender and rather long petioles: involucres ¼′ high, strongly imbricated, their bracts from ovate to oblong-linear obtuse and pointless, strongly nerved and tomentose-ciliate: flowers ochroleucous or cream-colored: achenes short for the genus, with 5 prominent angles and as many intervening ribs, not glandular, the angles and ribs scabrous-serrulate. [Plate 330.]

White Mountains, August 13 (no. 335). Plant with something of the aspect of *C. grandiflorus*; its root-growth not indicated; but very distinct in its short and much imbricated involucre of bracts passing very gradually from short to long, and also in the character of the achenes, which are far more like those of *Eupatorium*, the alternate angles being reduced to merely acute striae; they are almost those of *E. Fendleri*, yet in habit the plant is wholly *Coleosanthus*.

LACINIARIA LANCIFOLIA.

Stout, 3° high, glabrous: lowest leaves nearly 1° long, linear-lanceolate, 1-nerved, middle cauline more than half as long, broad in proportion and lanceolate, scarcely 3-nerved, *i. e.*, the lateral

nerves indistinct: spike of heads rather loose, 6′–10′ long, the campanulate involucres hardly ½′ high; bracts many and imbricated, oblong but with triangular-ovate acutish and wholly herbaceous but purple tips, the margin ciliolate; pappus short and subplumose, little longer than the pubescent striate achenes.

In marshy land at 6800 feet in the White Mountains, July 31 (no. 254). Plant with much the general aspect of *L. spicata*, but very distinct in the character of its involucre, the bracts of which in *L. spicata* are elongated and conspicuously striate, ending in a short rounded and scarious-margined tip. In the new species the bracts are so short and closely imbricated that no striate base is exposed, and the wholly herbaceous and marginless tips are somewhat ovate and acute.

ASTER HESPERIUS WOOTONII.

Plant of ampler foliage than in the type; inflorescence decidedly corymbose-paniculate; bracts of involucre in several series, but nearly equal, the outer herbaceous and slightly broader than the inner, all acute: lower cauline leaves spatulate-lanceolate, 4′ or 5′ long, the upper narrowly lanceolate, all serrulate, scabrous on the margin: branches strongly pubescent in lines.

Eagle Creek, White Mountains, Lincoln County, August 12 (no. 329), at 7000 feet altitude.

CHRYSOPSIS FULCRATA.

Tufted perennial, the stoutish erect stems 2° or 3° high, the whole herbage green, papillose-granular and perhaps somewhat viscid beneath a minute scabrous pubescence, some rather stiffly hirsute longer hairs clothing the stems and leaf-margins: leaves oblong, obtuse, sessile, ascending, only about an inch long, venulose: heads rather large, short-peduncled, subcorymbose at summit of stem and branches, the involucres subtended and partly concealed by one or more leafy bracts; proper involucral bracts in few series: rays numerous and large, golden yellow: achenes silky; outer pappus very conspicuous, of 20–25 linear-acuminate paleae.

Collected at various places in the White Mountains and Organ Mountains at elevations of 6000 to 6500 feet (nos. 510, 511, 512).

ERIOCARPUM SERRATUM.

Tufted perennial, the erect somewhat corymbosely branched stems 1½° high; the whole plant scabrous-puberulent; leaves

1′ long or more, from spatulate-oblong to linear-oblong, obtuse, closely and evenly spinulose-serrate: heads rather large, solitary at the ends of the branchlets: involucre somewhat hemispherical, nearly ¾′ broad, its coriaceous herbaceous-tipped bracts closely imbricated in many series: rays many, rose-colored on lower side, white on upper: achenes silky-pubescent, scarcely compressed, indistinctly angled: pappus of unequal coarse and rather rigid bristles which are merely scabrous, the longest little longer than the achene. [Plate 331.]

White Mountains, at 6800 feet, July 30 (no. 251). A fine and strongly characterized new species, more closely resembling a *Grindelia* than is the type of the genus, *E. grindeloides*; perhaps nearly related to the annual *E. rubiginosum*; also unquestionably akin to *E. gymnocephalum* by its partially reddish ray-flowers.

ERIOCARPUM WOOTONII.

Perennial, diffusely branched and depressed, the branches 8′–10′ long, canescent with a soft loose somewhat cottony pubescence, not glandular: leaves small and narrow, of a linear rachis and several rather remote pairs of short divaricate spinulose-tipped lobes: heads terminating numerous short leafy branchlets: involucre broad, its bracts with cottony-tomentulose green tips: rays deep yellow. [Plate 330.]

On the White Mountains, at 6500 feet elevation; the specimens barely in flower Aug. 19 (no. 518). Species with habit of *E. spinulosum*, foliage more like that of *E. australe*, the pubescence wholly peculiar.

GRINDELIA SCABRA.

Biennial, 2° high, the rather slender reddish stem and branches and thin foliage scabrous-pubescent: lowest leaves oblanceolate, petiolate, those of the branches oblong, sessile by a broader and somewhat clasping base: all sharply but not deeply spinulose-serrate: hemispherical involucre of very numerous bracts, all with subulate-alternate suberect herbaceous tips: rays of a deep golden yellow: achenes very small, somewhat compressed-pyriform, smooth, or with two or more striae, destitute of terminal crown or teeth, and with but a minute areola: bristles of pappus 2 or 3, scabrous-serrulate on the margins below. [Plate 332.]

White Mountains at 6300 feet, August 21 (nos. 224, 372).

ERIGERON ARENARIUS.

Annual, slender, weak and diffusely branching from the base, the branches 1° long or less; herbage minutely and softly pubescent: leaves mostly 1′ long, spatulate-linear, obtuse: heads terminating slender pedunculiform sparingly leafy-bracted branchlets; involucre 2″ or 2½″ high, the equal bracts roughly hirsutulous: rays 40 or more, not very narrow, white to lavender: achenes elongated and linear, little compressed; pappus of some 20 very delicate bristles deciduous from a callous ring.

Sand hills near Mesilla, June 17 (no. 23). With the aspect of some forms of *E. divergens*, but more allied to *E. Bellidiastrum*; the pappus perfectly simple.

ERIGERON FORMOSISSIMUS.

Perennial, somewhat tufted, 1°–1½° high, the stems erect or at base slightly decumbent: basal leaves oblanceolate, obtuse, entire, 1-nerved, 2½′–5′ long including the long-winged petiole, green and glabrous on both sides, ciliolate-margined; those of the stem 1′ long or more, oblong-lanceolate, acute, sessile: stem somewhat hirsute-pubescent, ending in one or two very large heads: involucre low-hemispherical, ¾′ broad, the biserial equal bracts with spreading green tips and with little pubescence: rays 100 or more, narrow, almost ¾′ long, from light rose-color to deep purple. [Plate 332.]

The type from an altitude of 10000 feet on Sierra Blanca Peak of the White Mountains, Aug. 16 (no. 352). A taller stalk of the same was collected by the present writer, on northward slopes of the Pinos Altos Mountains in September, 1880, and distributed for *A. glabellus*, a species to which this is certainly allied. The expanded heads are nearly two inches in diameter. In the far northern species, *E. glabellus*, they are barely ¾ of an inch, and the rays are much narrower, white, or pale; the heads being several and corymbose.

WOOTONIA gen. nov.

Opposite-leaved and dichotomously branched annual, of the Coreopsideae. Heads solitary in all the forks. Involucre simple, of a series of distinct and equal oblong erect bracts; or occasionally with vestiges of an outer involucre in the form of one or more narrow and spreading bractlets. Rays none. Disk-flowers 5 or 6, minute. Achenes linear, compressed but never thin, with two

thickish and obtuse angles and several intervening striae; the outer achenes glabrous, surmounted by a pair of stout divergent smooth and persistent awns which are channeled above, and runcinate at tip; inner achenes a fourth shorter than the others, pubescent and somewhat rugose-tuberculate, their awns shorter, stouter and divaricate.

WOOTONIA PARVIFLORA.

Stoutish annual 1° or 2° high; leaves ternately dissected into elongated and narrowly linear segments, the whole herbage glabrous: heads very small, on filiform peduncles, these much elongated in fruit and spreading or deflexed. [Plate 333.]

On plains near the White Sands, Doña Ana County, August 25 (no. 393). A quite distinct new type, about equally allied to *Bidens* and *Cosmos*, but impossible to be referred to either.

LAPHAMIA CERNUA.

Low and herbaceous stems from a short ligneous crown, only 3′ or 4′ high, with 3 or 4 pairs of rather ample leaves and a solitary terminal short-peduncled large head at first nodding and concealed beneath the leaves; plant nearly glabrous and slightly fleshy: leaves round ovate to deltoid-ovate, ¾′ long and as broad, coarsely and quite evenly dentate, the petiole rather longer than the blade: campanulate involucre nearly ½′ high: flowers dull orange yellow: rays none: corollas with short proper tube and long cylindric throat: outer and fertile achenes compressed, callous-margined, nerveless, puberulent, the inner infertile ones merely 4-angled; pappus in all of numerous very unequal barbellate bristles, the longest about equaling the proper tube of the corolla. [Plate 333.]

Organ Mountains, at 6500 feet altitude, September 4 (no. 476). A very distinct species, notable for its large solitary nodding heads.

SENECIO WOOTONII.

Stout, perennial, 2° high, leafy below, naked and loosely corymbose-panicled above, the whole plant glabrous from the first and glaucescent: leaves broadly or more narrowly lanceolate, 6′–10′ long, including the long winged and basally dilated petiole, the margins coarsely and obtusely dentate or serrate-toothed: heads ½′ high, numerous, erect, on long naked or linear-bracted peduncles; bracts of the campanulate involucre few and broad, thin-margined, acute: rays few, short, deep yellow: achenes columnar, glabrous, light-colored. [Plate 331.]

At an altitude of 7000 feet on the White Mountains, August 15 (no. 491). Not intimately allied to any other species; the glabrous glaucescent herbage somewhat like that of *S. microdontus*, but inflorescence and large heads of the group to which *S. Bigelovii* and its allies belong.

TETRADYMIA FILIFOLIA.

Compact low shrub, with short very leafy branches, but no fascicled foliage: leaves all filiform, ½′ to 1½′ long, ascending or suberect, permanently tomentose, as are all the leafy branchlets: heads few, terminating all the branchlets, 4-flowered; involucre short, of two oblong-linear and two oblong-ovate bracts, all obtuse and with arachnoid-ciliate margins: achenes glabrous; pappus long, of rather copious bristles, all abruptly dilated and serrulate at tip. [Plate 334.]

On Round Mountain of the White Mountain Range, at 5000 feet, July 21 (no. 183). Very distinct species, quite isolated from the rest of the genus geographically.

CARDUUS PERENNANS.

Rather slender, 3° high, from apparently deep-seated perennial roots, the herbage arachnoid-woolly when young, the maturer foliage glabrate above, white-wooly beneath: stem and few flowering branches leafy, even up to the few and scarcely pedunculate heads: lowest leaves lanceolate, subentire and spinose-ciliate' the others with shallow lobes: heads 1½′ high, ovate, the coriaceous and not strongly imbricated bracts arachnoid-wooly along the margin only, showing a narrow glutinous spot, and tipped with a stout somewhat spreading spine; flowers red or purplish: anther-tips attennate-subulate: some of the outer pappus bristles not at all plumose, and only sparingly barbellulate.

White Mountains, at 7000 feet, Aug. 12 (no. 326) and Organ Mountains, July 7. One of the very few perennial species indigenous to North America. In aspect more like *C. Arizonicus* than any other.

PTILORIA NEO-MEXICANA.

Tufted and much branched perennial, the slender reedy branches 1° to 2° high, clothed with a few linear and linear-subulate entire leaves and leafy bracts, the whole plant glabrous and glaucous: scattered involucres less than ½′ high, 5-flowered: achenes columnar and pentagonal, covered with minute sharp interrupted

transverse rugosities; pappus white, of about 15 bristles loosely long-plumose from toward the base, the basal part naked and scabrous and slightly thickened.

Mesas near Las Cruces, July 2 (no. 482). A species that may include much of the southern so-called *Stephanomeria minor*.

AGOSERIS GRAMINIFOLIA.

Perennial, 1° high or less, glaucous, the foliage glabrous, but scapes sparsely pilose below, woolly under the glabrous involucre: leaves all very narrowly linear, entire, acuminate: heads 1′ high, narrow and few-flowered: bracts of the involucre in about 3 series, ovate-lanceolate to linear-lanceolate: achenes gradually narrowed to a beak shorter than the body; pappus white, rather coarse, hardly scabrous. [Plate 334.]

At 7000 feet altitude in the White Mountains, in moist land, August 13 (no. 513), in fruit only.

Explanation of Plates.

PLATE 330, 1 and 2. *Eriocarpum Wootonii* Greene. 1. A portion of a plant half natural size. 2. Involucral bracts and flowers natural size. 3 and 4. *Coleosanthus ambigens* Greene. 3. A portion of a plant half natural size. 4. Involucral bracts, flower and achene natural size; also achene × 2.

PLATE 331, 1 and 2. *Senecio Wootonii* Greene. 1. Part of plant half natural size. 2. Involucral bract and ray flower natural size. 3 and 4. *Eriocarpum serratum* Greene. 3. A portion of a plant half natural size. 4. Ray-flower and achene natural size.

PLATE 332, 1 and 2. *Grindelia scabra* Greene. 1. A portion of a plant half natural size. 2. Involucral bract, ray flower and achene natural size. 3 and 4. *Erigeron formosissimus* Greene. 3. A portion of a plant half natural size. 4. Involucral bract, ray flower and achene natural size.

PLATE 333, 1 and 2. *Wootonia parviflora* Greene. 1. Entire plant half natural size. 2. Head of flowers and achenes natural size. 3 and 4. *Laphamia cernua* Greene. 3. Part of the plant natural size. 4. Involucral bract and flower natural size.

PLATE 334, 1 and 2. *Agoseris graminifolia* Greene. 1. A portion of a plant half natural size. 2. Achene natural size. 3 and 4. *Tetradymia filifolia* Greene. 3. Small branch of a plant half natural size. 4. Head, with one bract and three flowers removed, natural size.

Selaginella rupestris and its Allies.

By Lucien Marcus Underwood.

The variations of the species of *Selaginella* with many-ranked leaves have long been a puzzle to botanists if we may judge from the numerous herbarium and MS. names that have been given to various members of the group. Two clearly marked species from North America have been separated from the tangle already; besides these there remain the boreal *S. selaginoides* on which Beauvois founded the genus, and which needs no consideration here, and the widely varying forms that for the past forty years have found an unsatisfactory resting place under *S. rupestris*. For many years it has been evident that we have in this group several species as well marked as those which have been segregated already. In 1889 one of these species was found growing at Pasadena, California, and when in 1891 another was seen growing erect in sand fields in central Florida, the polymorphous nature of the group was even more forcibly impressed on us, and with it the impossibility of maintaining such divergent forms under a single species. Recognizing the fact that without abundance of material at hand and especially without consulting the largest collections not only of America but also of Europe, the description of new species would be a hazardous matter, we have hesitated until the great mass of material, especially at Kew, could be satisfactorily examined, meanwhile continuing to refer the various forms provisionally as variations of *S. rupestris*. We are now convinced that it is more logical as well as more scientific to designate these clearly marked forms by specific names. Even now, however, we are obliged to leave several well marked forms undescribed for lack of sufficient material and shall call attention to them briefly, in the hope that our field collectors in the west, in the southwest and in Mexico may give them better attention. The larger number of the species proposed below are comparatively local in their distribution; most of them are confined to the region west of the Mississippi.

1. SELAGINELLA RUPESTRIS (L.) Spring.

It may be something of a surprise to many to learn that the original or type locality of this somewhat widely distributed species is in the eastern United States, and it is here where it appears to be subject to comparatively slight variation. Since the original *Lycopodium rupestre* of Linnaeus had a distribution extending to Siberia, it is possible that this species, like many others, was a composite, but as Linnaeus after his usual brief diagnosis cited the excellent figure of Dillenius,* which the latter had characterized as the sharp square-spiked rock lycopod from Virginia and Pennsylvania, it is clear that whatever the status of the Asiatic plant, the plant of the eastern United States must bear the specific name assigned to it by Linnaeus.

Spring in his revision of the species † recognized two extremely generalized varieties neither of which clearly represents any plant in particular. His var. *α borealis* included the more rigid contracted forms which he attributed to the northern regions of Asia and America, while his var. *β tropica* included the more slender elongate forms from warmer latitudes. It is interesting to note in this connection that the most elongate member of the group, attaining, according to Professor D. C. Eaton,‡ a length of six feet, is found on the Pacific coast from Oregon to southern Alaska.

Milde§ distinguishes ten varieties, but as only one of them was American, and that from Mexico, his arrangement does not specially concern us at this time.

Baker still later ‖ united all the forms under a single species with a note in which he mentions *S. tortipila* as "a dwarf form" and cites two herbarium names of Nuttall. Singularly enough he recognizes *S. Oregana* D. C. Eaton as distinct, although the specimens of that species at Kew are all mixed up with the various forms of *S. rupestris*, often on the same sheets, and the cover for *S. Oregana* appears to be vacant. But this unceremonious massing of widely different species under the same cover is not uncommon in the Kew collection.

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* Historia Muscorum, *pl. 63. f. 11.*

† Monographie de la Famille des Lycopodiacées, seconde partie, 57. 1848.

‡ Bot. Cal. **2**: 350. 1880.

§ Fil. Europ. et Atlant., 262, 263. 1867.

‖ Handbook of Fern Allies, 35. 1887.

The species as here limited may be characterized as follows:

Stems creeping, 5–10 cm. long, more or less flexuous, the apices ascending, subsecund, abundantly emitting roots throughout their entire length; primary branches mostly short with 3–6 shorter secondary ones: leaves closely imbricate, about 8-ranked, spreading at the apex of sterile stems, narrowly lanceolate, 0.3–0.38 mm. wide, deeply channeled dorsally, ending in a subflexuous spinulose white awn nearly 1 mm. long; margins each with 6–9 slender cilia: spikes sharply quadrangular, 1–1.5 cm. long, about 1 mm. in diameter; bracts similar in texture to the leaves but broader at the base, with a shorter and stouter terminal awn and usually with more cilia on the margin.

On rocks, New England and Ontario, southward throughout the Appalachian region, westward to Missouri, Colorado, Idaho, Wyoming, California and British Columbia, extending to 7000 feet altitude.

Specimens collected by Kearney in eastern Tennessee have the leaves more lax, and more spreading branches, due, perhaps, to growth in moister places. Specimens growing in mountain exposures, particularly in the far West show shorter more incurved sterile branches and assume generally a more compact form of growth doubtless for better conserving their supply of moisture, but in all other characters do not differ essentially from the more typical eastern form. It will be a fortunate day when field collectors take more time to study in the field the environment of the plants they collect.

1a. SELAGINELLA RUPESTRIS FENDLERI var. nov.

Differs from the Eastern forms of the species in its lax, less crowded leaves which are tipped with a shorter white awn and their margins with short denticulate cilia; the spikes are flabby and flexuous, and the macrospores are more coarsely areolate.

Fendler, no. 1024, Plantae Novo-Mexicanae, 1847; Fort Collins, Colorado, C. F. Baker, no. 2. I would also refer to this variety a single sterile plant collected in the Organ Mountains, New Mexico, by E. O. Wooton, 1892.

2. SELAGINELLA WATSONI sp. nov.

Stems short, 4–6 cm. long, creeping, sparingly short branched, rooting throughout the entire length; leaves rather short, stout,

deeply channeled dorsally, ending abruptly in a short stout smooth mostly curved green awn, 0.25–0.35 mm. long; margins with few cilia or none, when present not exceeding 70μ in length; spikes 1.5–2.5 cm. long, sharply quadrangular, the bracts broader at base, lanceolate-ovate to ovate, with shorter and stouter awns.

Apparently confined to high altitudes of the Sierra Nevada and neighboring mountains. Cottonwood Cañon, Utah, alt. 9500 ft., S. Watson, no. 2370, in King's Expl. Exped., July, 1869; Clover Mts., Nevada, alt. 9000 ft., S. Watson, Sept., 1868. (U. S. Nat. Herb.); Cañon Pass (Sierra Nevada) alt. 8000–9000 ft., Aug., 1863 (Herb. D. C. Eaton); Alpine Co., California, alt. 8000 ft., Hansen (Herb. D. C. Eaton) also Hansen, 879 (Herb. Kew); Mt. Whitney, Tulare Co., California "1700 ft. above timber line" Coville & Funston, no. 2071, Death Valley Expedition.

3. SELAGINELLA MUTICA D. C. Eaton MS. in Herb.

"Stems creeping, rather rigid, 3′–6′ long, divided and pinnately branched; leaves glaucescent, six-ranked, closely imbricated, half a line long, oblong-ovate, convex and slightly grooved on the back, obtuse and without a terminal seta, the margins ciliated with about eight spreading cilia on each side; spikes scarcely thicker than the branches, quadrangular, the bracts broader than the leaves and pointed or even obscurely mucronate."

"Collected in New Mexico by the Mexican Boundary Commission and in several places in Colorado by Thomas Meehan, Mrs. E. J. Spence, etc."

This clearly marked species I have found described as above in Professor Eaton's collection and would add the following characters partly in emendation of those noted above. The cilia on the margins of the leaves are often 12–15 on either side (even in Eaton's specimens), are long and slender, often 120 μ or longer; the channels on the dorsal surfaces of the leaves are as clearly marked as in *S. rupestris*. The stems are well provided with roots throughout their whole extent.

Additional specimens in the Columbia Herbarium were collected in Colorado by Brandegee, A. G. Compton and Mrs. Livermore; also specimens from La Cuerba, New Mexico, Bigelow, 1853, Whipple's Exped. My own herbarium also contains specimens from Prescott, Arizona, J. W. Tuomey. In the U. S. Na-

tional Herbarium are additional specimens collected on the Mexican Boundary Survey.

4. SELAGINELLA ARENARIA sp. nov.

Deeply rooting in sand with fine copious roots often 15–20 cm. long; stems slender, branching, erect or ascending, densely caespitose, 5–8 cm. high, emitting copious brown wiry roots a little distance above the base; leaves closely appressed, narrowly lanceolate, 0.25 mm. wide, deeply channelled dorsally, terminated by a spinulose white awn 0.35–0.50 mm. long; margins with numerous short cilia; spikes 2–3 cm. long, slender, sharply quadrangular, the bracts broadly lanceolate, spreading at maturity with copious marginal cilia (15–20 on either side); microspores very abundant throughout the length of the spike, globose-tetrahedral, 36–39 μ in diameter, bright yellow or pale orange.

Growing in sand in open fields, Eustis, Florida, Jan., 1891, Underwood; July, 1894, Nash, no. 1449. A fragmentary specimen of the same plant is in the Chapman Herbarium and bears the note "Dry sand ridges, Gadsden Co., Florida, 1840." In addition to the remarkable habit and habitat of this species it produces a great abundance of microspores unlike the other members of the *rupestris* group.

In the Gray Herbarium there is a MS. description by Riddell with meagre specimens of plants from western Louisana and Texas which resemble the above species in habit but have spikes scarcely more than one-third as long; they may prove a distinct species, when Riddell's appropriate name should be taken up. To the same species we should refer plants of Drummond's Texas collection (Herb. Columbia and Herb. Kew), Riddell, no. 16 in Herb. Columbia and Reverchon's Texas Plants no. 1632, from Burnet county, on granite rocks, though the latter specimens show some slight variations particularly in the irregular ranking of the leaves.

5. SELAGINELLA RUPINCOLA sp. nov.

Stems suberect, somewhat flexuous, 8–12 cm. high, rooting only from near the base, pinnately branching, the secondary branches mostly very short; leaves channeled dorsally, closely imbricate, spreading only near the growing tips of the stem, glaucous or cinereous green, tapering toward the apex and ending in a

long white denticulate spine 1 mm. or more long; margins strikingly long ciliate, 15–20 on either side; spikes 1 cm. or less long, borne laterally on the branches, scarcely quadrangular, the bracts closely resembling the ordinary stem leaves so as to render the spikes scarcely distinguishable except for the axillary sporangia; macrospores dark-yellow, 0.24–0.27 mm. in diameter, strongly and deeply pitted reticulate.

On perpendicular rocks, Organ Mts., Doña Ana Co., New Mexico, alt. 6000 ft., E. O. Wooton, July 10, 1897. No. 2106 of Wright's collection, 1851–2 (Herb. Kew) belongs here, as also the erect plant of Palmer's no. 92, southwestern Chihuahua, 1885 (Herb. Kew); as represented in the Columbia herbarium, this number includes a second creeping sterile plant which belongs to a distinct species. A sterile plant in my herbarium, collected by Tuomey in the Santa Catalina Mts., Arizona, also appears to be the same species.

The macrospores of this species are only about half the diameter of those of *S. rupestris*. The plant evidently approaches what Milde had in mind in his var. *Mexicana*, but that is characterized as having "rami laxius dispositi longiores" and a "seta brevis parce denticulata," neither of which our plant possesses.

6. SELAGINELLA BIGELOVII sp. nov.

Stems slender, 10–20 cm. long, mostly ascending, flexuous, usually with short ascending primary branches; secondary branches infrequent and mostly very short; stems rooting only near the base; leaves about six-ranked, appressed-imbricate, usually with a distinct dorsal channel, narrowly lanceolate, tapering gradually into a densely spinulose white awn often 0.7 mm. long; margins with 12–15 cilia on either side which are directed forward and usually less than 50 μ long; spikes obtusely quadrangular, mostly on short lateral branches 5 mm. or less long, the bracts short, broadly ovate but otherwise like the leaves.

The original specimens collected by Bigelow (Whipple's Expedition) probably in California but without locality stated, appear to be sterile, but specimens collected by me at Pasadena, California, in January, 1889, and clearly referable to this species have a few fertile spikes from which the characters above noted are derived. The later specimens are usually more branched than those of Bigelow's original collection but are otherwise closely similar. To

this species we would also refer Parish no. 671, San Bernardino, Coville & Funston no. 101 from the same locality, and specimens collected from "San Ysabel" by H. W. Henshaw.

7. SELAGINELLA TORTIPILA A. Br. Ann. Sc. Nat. V. **3**: 2. 1865.

Stems 20–25 cm. long, more or less flexuous, with the elongate primary branches compound, rooting only near the base; leaves loosely imbricate, about six-ranked, narrowly lanceolate, scarcely channeled dorsally, ending in a contorted or irregularly coiled elongate hair point; margins with 6–12 very short cilia on either side: spikes very short (4–5 mm.) borne at the ends of ordinary branches, subquadrangular, but with loosely spreading broadly ovate-lanceolate bracts, which are dorsally channeled and bear marginal cilia and terminal hairs similar to those of the stem leaves.

Described from the type specimen, a duplicate of which, mixed with *S. rupestris*, has recently come into our possession, "In locis rupestribus humidis montium ad Broad River, Carolina, Sept. legit Rugel, July, 1841." Fragmentary specimens had hitherto been seen from Caesar's head, South Carolina, and from Saboola Mountain, Macon County, North Carolina, both collected by J. Donnell Smith.

This is the species which Baker describes as "a dwarf form" of *S. rupestris*, but which Milde characterizes very justly as "species pulcherrima!" The plant is much more elongate though more slender than *S. rupestris*, with which it has otherwise little in common.

8. SELAGINELLA EXTENSA sp. nov.

Stems slender, trailing, 35–40 cm. long, copiously emitting roots throughout their whole extent, with numerous primary branches 1.5–4 cm. long; leaves dark green, narrowly lanceolate with a slight dorsal channel, ending in a very short brownish or translucent point, mostly with no terminal spine: marginal cilia few, appearing like minute serrulations: spikes single or often in pairs at the ends of the primary branches, 1–2 cm. long, the bracts broadly lanceolate, ending abruptly in a point, strongly ciliolate on the margins.

On rocks and trees, Las Canoas, San Luis Potosi, Mexico. Pringle, no. 3900, August 21, 1891. Specimens are also in the Meissner Herbarium, collected in Mexico by C. Müller.

The plant was distributed under the name of *Selaginella rupestris*, var. *Mexicana* but it has nothing to do with the var. *Mexicana* Milde, Fil. Europ. et Atlant. 263. 1867, and this necessitates the adoption of a new name, as it properly deserves specific rank.

9. SELAGINELLA STRUTHIOLOIDES (Presl).

Lycopodium struthioloides Presl, Rel. Haenk. 1: 82. 1830.

Selaginella Oregana D.C. Eaton; Bot. Cal. 2: 350. 1880.

This plant should be restored to its proper name under which it was well described a half century before its second christening. Hooker* years ago recognized the identity of Presl's plant with the one collected by Scouler at Observatory Inlet, the specimen of which is preserved at Kew and agrees perfectly with the plant known from the Oregon woods whence it has been collected by numerous later explorers and distributed under various names. Singularly enough, Baker,† with Scouler's plant before him, referred *Lycopodium struthioloides* Presl which was originally described from "Nootka Sund" to *L. carinatum* Desv., a true *Lycopodium* from tropical Asia! It is so simple in certain quarters to overleap all geographical barriers in the effort to mass species.

The species above characterized can be readily separated by the following synopsis:

Stems spreading or creeping.
- Stems close creeping, usually less than 10 cm. long, rooting their entire length.
  - Leaves tapering into a conspicuous slender white awn. 1. *S. rupestris.*
  - Leaves ending abruptly in a minute greenish point. 2. *S. Watsoni.*
  - Leaves six-ranked, closely appressed, without awns or points. 3. *S. mutica.*
- Stems spreading, 20–25 cm. long, rooting only at the base; spikes 4–5 mm. long leaves ending in a tortuous white hair. 7. *S. tortipila.*
- Stems extensively trailing, 35 cm. to 1 meter or more long.
  - Stems scarcely rooting, 50–150 cm. long, lax with soft spreading leaves. 9. *S. struthioloides.*
  - Stems everywhere rooting, 35–40 cm. long, rigid with appressed leaves. 8. *S. extensa.*

Stems erect or ascending.
- Spikes 2–3 cm. long, plants deeply rooting in sand. 4. *S. arenaria.*
- Spikes 1 cm. or less long.
  - Leaves eight-ranked, with conspicuous long spreading cilia; spikes scarcely quadrangular. 5. *S. rupincola.*
  - Leaves six-ranked, slightly ciliate; spike quadrangular. 6. *S. Bigelovii.*

* Fl. Bor. Am., 2: 267. 1840.

† Handbook of Fern Allies, 17. 1887.

Besides the above species there are a number of interesting forms that are peculiar in standing strictly by themselves, having for the most part no very close alliances; the material in every case is scanty and for the greater part consists of wholly sterile plants; in order to call the attention of collecters to these forms they are briefly characterized; they are mostly found in the region extending from Texas to southern California and northern Mexico, a region already prolific in well marked species, and are particularly commended to botanists living or collecting in this portion of the country.

1. A prostrate plant with strongly secund leaves, usually showing a distinct dorso-ventral character both in color and arrangement of leaves; two forms occur, one with no hair point to the leaves and the other with a well developed hair point. To the former belong Parish, no. 1200, San Bernardino, California; Palmer, no. 455, southwestern Chihuahua, 1885; and a small plant collected by Major Emory in 1846. To the latter type belong Nealley, no. 555, Chenates, western Texas, 1889; and a plant collected by Fremont in California, 1845–7. All these forms are sterile.

2. A form with short rosette-like stem and leaves closely compacted and ending in a minute point. A mere scrap of this was collected in Inyo Co., California, by Coville and Funston, no. 628, Death Valley Expedition; a quite similar plant in Herb. Kew. is marked "*L. bryoides* Nutt." from San Diego and is presumably the plant referred to by Baker in his note under *S. rupestris*.

3. A very small creeping form with closely appressed scarcely pointed leaves and short clavate branches; a single meagre specimen collected on the Mexican Boundary Survey by Dr. Parry is in the Columbia Herbarium; a similar specimen in the Herb. Phila. Acad. Sciences is marked "*Lycopodium bryoides*" in Nuttall's own hand, while another specimen in Herb. Kew bears the mark, "*L. rupestre* β *brevipes*, Oregon, Nutt." All these sterile forms represent an interesting form and in connection with the facts above stated indicate clearly that the last word has yet to be said in regard to the members of this interesting group of species.

15 February 1898.

Studies in the Botany of the Southern United States.—XIII.

By John K. Small.

I. SPECIES HITHERTO IMPERFECTLY UNDERSTOOD.

Baptista laevicaulis (A. Gray).

Baptista leucophea var. *laevicaulis* A. Gray; Bot. Gaz. **4**: 132. 1879.

Perennial, nearly glabrous. Foliage turning blackish in drying: stems erect, 3–7 dm. tall, branching: leaves 3-foliolate; leaflets leathery, obovate or cuneate-obovate, 4–8 cm. long, mucronulate to retuse at the apex, delicately reticulated: racemes somewhat declined, 1–3 dm. long, 1-sided: pedicels 3–6 cm. long, subtended by ovate or oblong-lanceolate acute bracts: calyx pubescent within, 1 cm. long, prominently nerved; segments, except the upper one, lanceolate or ovate-lanceolate, about as long as the tube: corolla dull yellow; standard orbicular-ovate, 2 cm. in diameter, deeply cleft, rather abruptly narrowed into the short claw; wings and keel-petals with blades over 2 cm. long: pods firm, oval, 3–4 cm. long, with a slender curved beak and a stipe at least as long as the calyx.

On prairies, Louisiana and Texas.

A large species with the general habit of *Baptista leucophaea*, but with almost glabrous foliage. The only pubescence on the leaves and their stipules is a sparse villous ciliation. The stems and inflorescence are glabrous or practically so, save the dense lustrous pubescence lining the inside of the calyx-tube and covering the ovary.

The first specimens were collected by Dr. Hale in Louisiana, number 210. Mr. Langlois found the species in Calcasieu and St. Landry Counties, western Louisiana in the years 1884 and 1885. As the species has been described but imperfectly as a variety, I have given the above description.

Kraunhia macrostachys (T. & G.).

Wistaria frutescens var. *macrostachys* T. & G. Fl. N. A. **1**: 283. 1838.

Wistaria macrostachys Nutt.; T. & G. Fl. N. A. **1**: 283. As synonym. 1838.

A vine climbing over bushes or trees, 1–7 meters high. Stems more or less branched, becoming 2–3 cm. thick: leaves 2–3 dm. long or rarely shorter: leaflets usually 9, ovate or oval-ovate to elliptic or elliptic-lanceolate, 3–7 cm. long, acuminate, ciliate, rounded or cordate at the base: racemes 2–3 dm. long, loosely-flowered, drooping; rachis and pedicels densely hirsute and glandular: calyx pubescent like the pedicels; tube campanulate; segments lanceolate or narrowly-lanceolate, acuminate, the lateral ones about as long as the tube and the lowest one much longer: corolla lilac-purple or light blue; standard with a short claw and suborbicular blade, this rather broader than high, 1.5 cm. in diameter, acuminate at the base; wings 1.5 cm. long, the subulate-linear spur about as long as the claw: pods 5–10 cm. long, torulose, reddish-brown, rather obtuse: seeds oblong or cylindric-oblong, black, lustrous.

In swamps, Missouri to Tennessee and Arkansas. Spring.

Missouri. *Eggert.*

Tennessee: Covington, 1881, *Byars;* Forked Deer River, 1893, *Bain.*

Arkansas: Craighead county, 1893, *Eggert.*

Sufficient material has now been collected to prove this *Kraunhia* of the central Mississippi Valley a perfectly distinct species. This fact was observed by Mr. Nuttall many years ago. The elongated racemes with their rather shaggy hirsute and glandular pubescence readily separate the plant from the eastern *Kraunhia frutescens.* Strong characters are furnished by the flowers; the calyx-segments are as long as the tube, or the lower one longer, and the blade of the standard is decurrent on its claw. In *Kraunhia frutescens* we find contrasting characters for all these parts.

I have received valuable field notes from Mr. Henry Eggert, Dr. James Byars and Prof. S. M. Bain.

HIBISCUS INTEGRIFOLIUS (Chapm.).

Hibiscus coccineus var. *integrifolius* Chapm. Fl. S. States, Ed. 2, 610. 1884.

Hibiscus semilobatus Chapm. Fl. S. States, Ed. 3, 52. 1897.

As indicated in the preceding line, during the past year this neglected plant was given specific rank, but unfortunately under an untenable name. The comparatively blunt calyx-segments fur-

nish a character not yet noted as a means of distinguishing between the present species and *Hibiscus coccineus*.

PHACELIA BOYKINII (A. Gray).

Phacelia fimbriata var. *Boykinii* A. Gray, Proc. Am. Acad. 10: 320. 1875.

Annual, sparingly strigillose. Stems erect, more or less branched, 1–2 dm. tall, glabrate in age: leaves 1–3 cm. long; blades pinnatifid, rough, the lower ones petioled, the upper sessile; segments obtuse, abruptly pointed or mucronate: racemes many-flowered, 3–7 cm. long: pedicels erect, about as long as the calyx at maturity: calyx bristly; segments oblong, 3–3.5 mm. long, prominently nerved, obtuse: corolla bluish, 7–8 mm. broad; segments oblong-obovate, laciniate; appendages obsolete: filaments exserted, sparingly villous: capsules ovoid-globose, 2.5 mm. in diameter.

In dry soil, Columbus, Georgia.

There can be no doubt that this form is specifically distinct from *Phacelia fimbriata* and other related species. The firmer texture of the foliage, the rigid stems and branches, the abruptly pointed or mucronate leaf segments, the many-flowered narrow racemes with their short pedicels, the small corollas and small capsules are characters separating the plant from *P. fimbriata*. The original specimen was collected by Dr. Boykin in 1839.

II.—NEW SPECIES OF HERBACEOUS PLANTS.

THALICTRUM CAULOPHYLLOIDES.

Perennial by a horizontal rootstock, deep green, glabrous. Stems erect, 6–12 dm. tall: leaves 2–5 dm. long, spreading, with long petioles: leaflets firm; blades oval to suborbicular in outline, often broader than long, 4–9 cm. in diameter, glaucous and prominently nerved beneath, cordate or truncate, 3–5-lobed above the middle; lobes apiculate: petiolules slender, 5–30 mm. long: pedicels 8–20 mm. long, wire-like: fruit elliptic, 6 mm. long, sharply ribbed, contracted into stipes 1.5–2 mm. long, tipped by the persistent club-shaped style.

On mountain slopes, Tennessee. Spring and summer.

I have suspected the existence of another species of *Thalictrum* in the southern Alleghanies for several years. This winter Prof-

Ruth sent me mature specimens of the hitherto imperfectly understood form which I have just described. The leaflets of the species bear a strong resemblance to those of *Caulophyllum thalictroides*, whence the specific name. In this respect they differ from those of the nearest relative, *Thalictrum coriaceum*. The best character, however, exists in the fruit which is larger and narrower than that of *T. coriaceum*. The style is one-half as long as the achene or shorter and is club-shaped, thus differing from the longer style of its relative, which is subulate at maturity. The type specimen was collected by Prof. Ruth on mountain sides, Cade's Cove Mountain, Tennessee, July, 1892, number 1800.

CAPNOIDES HALEI.

Annual, glabrous, bright green. Stem branched at the base; branches spreading or ascending, 1–3 dm. long, simple or sparingly branched: leaves glaucescent beneath, the lower ones with petioles longer than the blades, the upper ones sessile, all dissected; segments rather coarse, acute: racemes erect, peduncled, 2–5 cm. long: bracts ovate to elliptic, acuminate: pedicels 2–5 mm. long, stout: corolla yellow, about 1.5 cm. long, the spur obtuse, much shorter than the body, the outer petals with thin incised-toothed crests: capsules stoutish, 2 cm. long, straight, erect or nearly so, on short, almost erect pedicels.

In dry soil, Florida to Louisiana. Spring.

Specimens of the species here described were collected many years ago in Louisiana by Dr. Hale, and lately Mr. Curtiss has distributed excellent material from the vicinity of Jacksonville, Florida, representing his number 4515, at least in part.

Capnoides Halei is most closely related to *Capnoides curvisiliquum* from which it may easily be distinguished at sight by its more slender habit, and especially by the more coarsely dissected leaf-blades; the corolla is of a much less brilliant yellow and the spur is much shorter than the body, whereas, in *Capnoides curvisiliquum* the spur and body of the corolla are equal in length. The capsules are erect or nearly so and straight as compared with the curved pods of its relative.

WALDSTEINIA PARVIFLORA.

Perennial by horizontal rootstocks, glabrous or villous-hirsute. Leaves basal, 1–3 dm. tall: petioles much longer than the blades

and usually less pubescent than the scapes: blades 3-foliolate; leaflets cuneate-obovate or broadly rhomboidal, 2–8 cm. long, coarsely and irregularly crenate or lobed: scapes erect, solitary or several together, commonly shorter than the leaves, more extensively corymbosely branched: calyx usually pubescent, often nodding; tube broadly turbinate, 2.5–3 mm. long; segments triangular-lanceolate or lanceolate-acuminate, often shorter than the tube: petals linear oblong or narrowly elliptic, shorter than the calyx-segments or slightly longer: achenes obovoid, 3 mm. long.

In woods or shaded soil, southwestern Virginia, North Carolina, Tennessee and Georgia. March to May.

Recent collections from the Southern States bring to light a third species of *Waldsteinia* for the North American flora. The new species may be distinguished from *W. fragarioides* by the more prominent disk, the small sessile petals which are about as long as the calyx-segments or shorter, and the larger obovoid achene. I have seen the following specimens:

Virginia: Marion, June, 1892, *Mrs. Britton* and *Miss Vail.*

North Carolina: Dunn's Mountain, April 20, 1896, *Small.*

Tennessee: Dandridge, March, 1842, *Rugel*; Knox county, May, 1897, *Ruth*, number 2140.

Georgia: Toccoa Falls, August 8, 1893, *Small*; Gainsville, April 20, 1897, *Huger.*

NEPTUNIA FLORIDANA.

Perennial, diffuse. Foliage sparingly pubescent or glabrate, bright-green: stems several from large roots, ascending or spreading, 3–7 dm. long, commonly branching, more or less scabro-pubescent: leaves rather numerous, with 3–5 pairs of pinnae: stipules lanceolate, acuminate: leaflets oblong or narrowly-oblong, 4–5.5 mm. long, often mucronulate, ciliate, prominently 3-nerved, sessile: peduncles slender, much longer than the subtending leaves: heads oval or oblong, 1–1.5 cm. long: pods oblong, 2.5–3.5 cm. long, apiculate, rather lustrous, glabrous: stipe 2–4 mm. long: seeds 5–10.

In sand, Florida to Louisiana.

Heretofore confused with *Neptunia lutea*, but very different. Easily distinguished by the glabrate or sparingly pubescent foliage, the long slender peduncles and the oblong glabrous rather many-seeded pods with short stipes. I note the following specimens:

Florida: *Chapman*, various collections; St. Marks, June, 1843. *Rugel;* between Everglades and Biscayne Bay, *Curtiss*, no. 726; Eustis, Lake County, May and June, 1894, *Nash*, no. 686.

Louisiana: *Hale.*

BAPTISIA HUGERI.

Perennial, minutely pubescent. Foliage but little changed in drying: stems erect, 3–6 dm. tall, branching: leaves 3-foliolate, variable; stipules lanceolate or linear-lanceolate, 1.5–2 cm. long, acute; leaflets elliptic, somewhat acuminate at both ends or those of the lower leaves oblanceolate, 5–6 cm. long, somewhat lustrous above, the minute pubescence often abundant at the nerves, these conspicuous: racemes about 1 dm. long, few-flowered: pedicels 4–6 mm. long, with bracts similar to the stipules: calyx campanulate, 6–7 mm. long; segments, except the upper one, lanceolate-acuminate, about as long as the tube: corolla bright yellow; standard with a suborbicular notched blade about 12 mm. in diameter; wings nearly 2 cm. long, their blades almost oblong; keel petals similar to the wings, but oblong-obovate: stamens deciduous: ovary stipitate.

On mountain slopes, Cornelia, Georgia. Spring.

A yellow-flowered species related to *Baptisia megacarpa*, but the leaflets are acute or acuminate at both ends and conspicuous on account of their pale nerves. The foliage is more pubescent and the flowers smaller. The lower calyx-segments are conspicuously acuminate and not obtuse or acutish as they are in *B. megacarpa.*

The type specimens were collected on the northern slope of Mount Griffin, near Cornelia, in northern Georgia, on May 1, 1897, by Mr. A. M. Huger, for whom the species is named.

BAPTISIA CUNEATA.

Perennial, glabrous. Foliage slightly discolored in drying: stems erect, 3–5 dm. tall, sparingly branched: leaves 3-foliolate: stipules lanceolate: leaflets leathery, cuneate, sometimes slightly cuneate-rhomboidal, 3–6 cm. long, often mucronulate, barely reticulated: racemes about 1 dm. long, slender, short-peduncled: pedicels slender, 1.5–2.5 cm. long: bracts lanceolate or ovate-lanceolate, acuminate, deciduous: calyx campanulate, nearly 1 cm. long; segments, except the upper one, ovate, acute: corolla pale cream-colored; standard broader than high, nearly 2 cm. broad,

notched, abruptly narrowed into the claw; wings and keel petals with blades 2 mm. long.

In sand, Nueces Bay, Texas.

Related to *Baptisia bracteata* but with glabrous foliage. The broad cuneate leaflets are not known in the related species. The pedicels are much longer and the calyx-segments abruptly pointed and not acuminate as they are in *B. bracteata*. The ovary, too, is glabrous or nearly so.

The type was collected by Mr. Heller along Nueces Bay, Texas, on April 3, 1894. Number 1523.

POLYGALA LEWTONII.

Birennial. Foliage glabrous, bright green. Stem much branched at the base; branches numerous, ascending or decumbent, 1–2 dm. long, simple, sharply-angled: leaves clustered, crowded, fleshy, spatulate or linear-spatulate, 1–2 cm. long, acute or acutish, wrinkled in drying: racemes 1–5 cm. long, loosely-flowered: pedicels slender, 1–2 mm. long: sepals various, dorsal broadly oblong, anterior narrowly-oblong, both 2 mm. long, obtuse; wings deep pink, inequilateral, half-rhombic, 4.5–5.5 mm. long: corolla deep pink: petals about 4 mm. long, the keel more finely lacerate than in *P. polygama*: style from the truncate top of ovary, ascending, cucullate above the middle, tufted appendage and stigmatic gland not approximate: capsule oblong-prismatic, 5 mm. long, glabrous: cleistogamous racemes slender, few-flowered; pedicels slender, 1–1.5 cm. long, curved.

In sand, peninsular Florida.

A unique species of a low habit, related to *Polygala polygama*. It may be distinguished by its small, fleshy, clustered leaves. All the parts of the flower are diagnostic, the oblong outer sepals and the half-rhombic inner sepals are very different from the corresponding organs in *P. polygama*. In *P. Lewtonii* we find a narrowly oblong pod about thrice as long as broad, while in its relative we have a broad pod whose length only slightly exceeds the breadth. Cleistogamous flowers do not seem to be produced as freely as in the case of *P. polygama*, and the pedicels varying from 1–1.5 cm. in length have nothing similar in the latter species.

TRIADENUM LONGIFOLIA.

Perennial. Foliage deep green, glabrous: stems erect, 3–6 dm. tall, simple below the inflorescence: leaves opposite; blades

oblanceolate, oblong or elliptic, thinnish, obtuse or notched at the apex, undulate, truncate or subcordate at the base, sessile: cymes terminal or axillary, few-flowered, sessile or short-peduncled; pedicels stout, 1–2 mm. long: sepals lanceolate or linear-lanceolate, 3–4 mm. long, acuminate: capsules oblong, about 1 cm. long, acute, glabrous, striate.

In low ground, Alabama and Florida. Summer.

A strongly marked species related to *Triadenum petiolata*, but with longer, thinner sessile or nearly sessile leaves, which are truncate or partially clasping at the base. The sepals are lanceolate and acuminate, as contrasted with the oblong, obtuse sepals of *T. petiolata*.

The originial label accompanying the type specimens reads as follows: "In fossis prope Summerville, Alabama, et ad fluv. Apalachicola, Florida, legit Rugel, Aug.–Oct., 1843."

PHACELIA BICKNELLII.

Annual, strigose. Stems branched at the base; branches erect or ascending, 1–3 dm. tall, commonly branching: leaves 1–4 cm. long; blades pinnatifid, the lower ones petioled, the upper sessile and somewhat clasping; segments acute: racemes many-flowered, 4–10 cm. long: pedicels about as long as the calyx at maturity: calyx bristly; segments linear, 5 mm. long, revolute: corolla pale blue, 4 mm. broad; segments oblique, irregularly toothed, pubescent without; appendages obsolete: filaments included, about as long as the tube, glabrous: capsules subglobose, 2 mm. in diameter: seeds sharply reticulated, reddish brown.

In barren soil, Tennessee. Spring.

Most closely related to *Phacelia Boykinii*. The habit of the plant especially the upper portion, is strongly suggestive of the inflorescence of *Heliotropium*, section TIARIDIUM. The calyx-segments are linear as contrasted with the oblong segments of *P. Boykinii*, while the corolla is only about one-half as large, and its segments are irregularly toothed instead of laciniate. The glabrous filaments also serve as a means of separation.

The original specimens were collected by Mr. E. P. Bicknell, near Nashville, Tennessee, in May, 1894.

PHACELIA LAXA.

Annual, sparingly hirsute. Stems branched at the base; branches spreading, 1–3 dm. long, simple or forked, slender:

leaves 2–6 cm. long; blades pinnately-lobed, the lower ones long-petioled, the upper short-petioled; lobes entire, ascending: racemes lax, few-flowered, 4–12 cm. long; pedicels spreading or recurved, much longer than the calyx at maturity: calyx sparingly bristly; segments obovate or suborbicular, 4–6 mm. long, obtuse, ciliate, variable in same calyx: corolla lilac or light blue, 1 cm. broad; segments rounded, entire, about as long as the tube; appendages present: stamens glabrous, shorter than the corolla: capsules suborbicular, hirsute near the top.

Differs from *Phacelia patuliflora* in the less dense pubescence and in the petioled few-lobed leaf-blades. Besides these differences in foliage, the short pedicels, the short obovate or suborbicular calyx-segments and the smaller corolla (1 cm.) all furnish ready means of separating *Phacelia laxa* from *P. patuliflora*.

The type specimens were collected by Mr. Heller along Nueces Bay, Texas, March 12, 1894, number 1446.

MARILAUNIDIUM TENUE.

Annual, hirsute. Stems erect, 1–1.5 dm. tall, simple below, dichotomous above, wiry: leaves opposite, blades linear or slightly broadened upward, 1.5–3 cm. long, sessile: pedicels slender, 1–3 mm. long: calyx bristly; segments linear-filiform, 4–5 mm. long, erect, acute: corolla purplish, 5–6 mm. long, much surpassing the calyx; tube funnelform, about 6 mm. long; segments suborbicular, 3–3.5 mm. broad.

In dry soil, Indian Territory and Texas. Spring.

A low and slender species somewhat resembling *Marilaunidium augustifolium* (*Nama dichotomum* Choisy, var. *augustifolium* A. Gray), but more densely pubescent and with wider spreading branches. The large corolla which is much longer than the calyx separates it from *M. augustifolium* and associates it with such plants as *M. demissum* and *M. hispidum*. The following are typical:

Texas: Corpus Christi, March 14–21, 1894, *Heller*, number 461.

Indian Territory: 1868, *Palmer*, number 194.

SCUTELLARIA OCMULGEE.

Perennial, softly pubescent. Stems erect, 4–8 dm. tall, more or less branched above, densely pubescent with short villous hairs: leaves opposite; blades ovate to suborbicular, 3–8 cm. long, obtuse or acutish, crenate, cordate, or the uppermost trun-

ate: petioles about ½ as long as the blades: racemes panicled, leafy-bracted, 5–10 cm. long: bracts similar to the leaves but smaller: pedicels stout, 1–3 mm. long: corolla bright blue, 2 cm. long; tube short, gradually dilated; lower lip suborbicular, 6–7 mm. broad, entire; upper lip with an entire middle lobe, not reflexed.

On river banks, middle Georgia. Summer.

Related to *Scutellaria cordifolia*, but the leaf-blades are broader, more rounded and more truly crenate. In the corolla we find a shorter gradually dilated tube, an entire lower lip and an entire and straight upper lip.

The type specimens were collected by the writer on the banks of the Ocmulgee River above Macon, Georgia, in July 1895.

Scutellaria arenicola.

Perennial, pubescent with short upcurved hairs. Stems erect or ascending, simple or branched near the base; branches 2–4 dm. long, more or less branched above: leaves firm; blades ovate to elliptic, 1.5–3 cm. long, obtuse or acute, sharply or crenate serrate, lower ones truncate at the base, upper cuneate: petioles shorter than the blades: racemes 2–10 cm. long: bracts with oblong-oblanceolate or oblanceolate blades: pedicels ascending, 2–7 mm. long: corolla blue, 2–2.5 cm. long; tube gradually dilated; lower lip suborbicular, 1 cm. broad, slightly lobed, notched; upper lip usually apiculate.

In sand, peninsular Florida. Summer.

Resembling *Scutellaria integrifolia major* Chapm. but much more leafy. The texture of the leaf-blades is much firmer and the nerves prominent, while the margin is toothed to the apex, and none of the leaves entire, as in the case of its nearest relative.

The corolla furnishes characters in the entire lower lip and the merely undulate upper lip; the lower lip of *S. integrifolia major* being erose, while the upper one is manifestly lobed. I have the following specimens:

Florida: Eustis, Lake county, July 16–31, 1894, *Nash*, number 1316. Forest City, Orange county, July, 1894, *Lewton*.

Scutellaria Altamaha.

Perennial, pilose-canescent throughout, dull green. Stems erect or assurgent, 2–4 dm. tall, obtusely 4-angled, simple, strict,

purplish: leaves numerous, opposite; blades ovate or elliptic, 1.5–5 cm. long, obtuse or acutish, serrate, densely punctate, sessile or nearly so, the upper surface somewhat marked with impressed nerves, the lower surface paler, marked with prominent lateral nerves: racemes rather crowded at the end of the stem: calyx campanulate, 2–5 mm. long, faintly ribbed, grandular punctate, with both lips of the same size: corolla pale blue, 1–1.3 cm. long, contracted and curved at the base, glandular-punctate and glandular-pilose, delicately nerved; lower lip suborbicular, notched at the side; upper lip much larger than the lower, nearly truncate at the apex, with an ovate segment at each side: stamens slightly surpassing the upper lip; anthers strongly bearded.

Collected by the writer along the Altamaha River swamp in Liberty county, Georgia, June 18–21, 1895.

Nearest *Scutellaria pilosa*, but more rigid in habit. The numerous firm sessile or very short-petioled leaf-blades with their comparatively finely serrate margins form a strong contrast with the sparse thin coarsely-crenate or crenate-serrate, long-petioled leaf-blades of its most closely related species. The corolla too is much smaller. In addition to these differences, the pubescence is much shorter and is more dense.

VERNONIA FLACCIDIFOLIA.

Perennial, sparingly pubescent or glabrate. Stems erect, 1–1.5 meters tall, slender branched above: leaves rather numerous; blades thin, elliptic below to linear-lanceolate above, 0.8–2 dm. long, acuminate, sharply serrate, sometimes doubly so, attenuate into short petioles: corymbs 1–2 dm. broad; branches slender: peduncles barely enlarged at the top: involucres hemispheric, 3–4 mm. high, light green: bracts ovate to oblong, obtuse, ciliate, sometimes colored at the tip, not at all spreading: pappus pale straw-color: achenes 3 mm. long, with sharp ribs upwardly barbed.

On wooded hillsides, Ringgold, Georgia.

A species of rather delicate habit related to *Vernonia ovalifolia* T. & G., but differing in its much less rigid habit, glabrate foliage and larger differently shaped leaves which are of a very thin texture. The smaller involucres with their obtuse bracts and the pale straw-colored pappus are diagnostic.

The original specimens were collected by the writer on mountain sides about Ringgold in northwestern Georgia, in August 1895.

VERNONIA PULCHELLA.

Perennial, hirsute. Stems solitary or clustered, 3–10 dm. tall, branched above: leaves firm; blades oblong-oblanceolate or oblong to nearly linear-lanceolate, 2–10 cm. long, acute, serrate, often sharply so, somewhat crisped, revolute, sessile but not at all cordate: corymbs 1–1.5 dm. broad: peduncles 1–3 cm. long, slightly enlarged upward or some heads nearly sessile: involucres campanulate, 6–7 high, often purplish: bracts lanceolate to linear-oblong, prolonged into linear-subulate spreading or recurved tips: pappus pale straw-colored: achenes 3 mm. long, with upwardly barbed ribs.

On sand hills, Georgia.

A handsome species related to *Vernonia scaberrima* Nutt. It is, however, more robust in habit and has larger serrate leaves which are destitute of the peculiar base characteristic of *Vernonia scaberrima*. The tips of the involucral bracts are more slender and less rigid than those of its relative.

The type specimens were collected by the writer on sand hills bordering the Altamaha River swamps in Liberty county, Georgia, in July 1895.

VERNONIA TENUIFOLIA.

Perennial, with thinly pubescent foliage. Stems erect, 0.5–1 m. tall, branching above: leaves numerous; blades linear or nearly so, 0.5–1.5 dm. long, acute, serrate, minutely punctate, sessile: corymbs 5–10 cm. broad, with rather few heads: peduncles slightly enlarged upward: involucres campanulate, 8–10 mm. high, purple: bracts ovate to oblong, erect, acute or mucronate: pappus straw-colored or tinged with purple: achenes about 4 mm. long, with smooth and glabrous ribs.

In dry soil, western Texas.

Although this form has been confused with *Vernonia marginata* it is abundantly distinct. Its leaves are manifestly serrate while the broader and shorter involucres with their merely acute or mucronate bracts are very different from the narrower involucres and the acuminate bracts which are characteristic of *Vernonia marginata*.

SILPHIUM RUMICIFOLIUM.

Perennial, glabrous or nearly so, bright-green. Stem erect, 4–8 dm. tall, simple below, corymbosely branched above, grooved, reddish purple, stout: leaves mainly basal; blades leathery,

oblong to oblong-obovate, 1–1.5 dm. long, rounded at the apex, repand-undulate, smooth, red-nerved above: petioles shorter than the blades, winged, dilated and sheathing at the base: stem-leaves few, much reduced, narrow, serrate: pedicels stout, 5–12 cm. long, with several deciduous bracts: involucres hemispheric, 2 cm. broad: bracts various, the outer orbicular-ovate, about 1 cm. long, the inner oblong, about 1.5 cm. long, rounded: corollas 6–7 mm. long: rays yellow, 1.5–2 cm. long, notched at apex: achenes oblong-obovoid, 9–10 mm. long, narrowly winged, notched at the apex.

In dry sterile soil, Tennessee. Summer and fall.

I noticed this form as a new species in one of the larger herbaria several years ago. Prof. Ruth now sends newly prepared specimens of the same from Knoxville, Tennessee, where he collected them in September 1897, number 4024.

The new species is related to *Silphium terebinthaceum*, but the obovate type of leaf-blade with the tapering base is not characterstic of that species. A prominent character exists in the involucre where the outer bracts are broader than long, while in the most closely related species the corresponding bracts are longer than broad.

COREOPSIS LEWTONII.

Perennial glabrous. Stems branched at the base; branches ascending or slightly decumbent and erect, 3–5 dm. tall, slender, simple, or sparingly branched above: leaves opposite, approximate below, distant above; blades linear or narrowly linear-cuneate, 1–3 cm. long, obtuse or acutish: petioles somewhat shorter than the blades, often filiform: peduncles filiform, 1–7 cm. long: involucres 7–8 mm. broad: bracts scarious-margined, outer ovate, 1–1.5 mm. long, obtuse, inner oblong or oblong-lanceolate, 5–6 mm. long, obtuse or acutish: rays yellow, broadly cuneate, about 1 cm. long, 3-lobed; lateral lobes gradually rounded; terminal lobes notched: corolla yellow, 2 mm. long, segments recurved: style 2 mm. long, glabrous: achenes oblong to suborbicular; body elliptic, 2 mm. long; wings broad, entire; awns short.

In low sandy soil, peninsular Florida. Summer.

A species related to *Coreopsis angustifolia* but much more delicate in habit. Readily distinguished by the manifestly petioled leaf-blades, the broader and more amply lobed rays and the entire short-awned achenes.

The original specimens were collected by Mr. F. L. Lewton at Forest City, Orange County, Florida 1894.

SENECIO EARLEI.

Perennial, bright green, densely cottony below, sparingly so and glabrate above. Stems usually tufted, erect or ascending, 2–5 cm. tall, simple or nearly so below, corymbosely branched above: leaves various, basal quite numerous; blades oval or oblong, 1.5–6 cm. long, serrate, obtuse or retuse, often crimson beneath: petioles longer than the blades; stem-leaves pinnatifid, linear-lanceolate or oblong, the lower ones with petioles, the upper sessile: pedicels slender: involucres hemispheric, 8–9 mm. broad, 8–10 mm. high: bracts of the involucres linear or nearly so, 5–5.5 mm. long, acute, hyaline-margined: rays oblong, 4–6 mm. long, bright yellow, corolla yellow, 4–4.5 mm. long; segments triangular or ovate: style glabrous: achenes 3 mm. long, scabro-pubescent on the angles.

In dry soil, Tennessee and Alabama. Spring and summer.

A showy species related to *Senecio tomentosus*. The main points of difference are: First, the almost wholly glabrous foliage, only the base of the plant permanently woolly. Second, the shorter petioles, and shorter, more rounded and more finely toothed leaf-blades. Third, the more open inflorescence and more numerous heads. Named for Prof. F. S. Earle, of Auburn, Alabama.

I have the following specimens:

Alabama: Auburn, Lee County, 1896, *Earle* and *Underwood*.

Tennessee: Knoxville, Knox County, 1897, *Ruth*, number 4211.

SENECIO MEMMINGERI Britton.

Perennial, glabrous or nearly so, bright green. Stems erect, solitary or tufted, 3–6 dm. tall, simple below, corymbosely branched above, accompanied by tufts of basal leaves: basal leaves 1–2 dm. long; blades bipinnatifid, longer than the petioles; segments oblong or obovate in outline, more or less cuneate at the base, coarsely toothed or incised, the teeth entire or with 1 or 2 small teeth: blades of the stem-leaves similar but usually more finely divided: corymbs 5–15 cm. broad: heads usually numerous: involucres campanulate, 6–7 mm. broad: bracts linear, the longer 5 mm. long, acute, scarious-margined: corollas 4–4.5 mm. long; segments triangular-ovate: rays yellow, linear-oblong, 5–6 mm. long, 3-toothed at the apex: achenes grooved, 1.5 mm. long, pubescent.

In dry soil or on cliffs in or near the mountains, North Carolina and Alabama. Spring and summer.

Most closely related to *Senecio Millefolium*, but clearly distinguished by the coarse leaf-segments. The original specimens of this species were collected in Henderson county, North Carolina, by Mr. E. R. Memminger, in 1887. In 1891, in company with Mr. A. A. Heller, I found the plant on Blowing Rock Mountain in northwestern North Carolina. Prof. Underwood and Prof. Earle have given me specimens almost identical with the North Carolina plants from Auburn, Lee county, Alabama, where they collected it on May 16, 1896.

HIERACIUM ARGYRAEUM.

Perennial, the lower parts shaggy with long hirsute hairs. Stems erect, 3–6 dm. tall, mostly simple below, corymbosely branched above, and there naked: leaves mainly near the lower part of the stem; blades oblong-oblanceolate to oblong, 2–8 cm. long, slightly apiculate, shaggy pubescent on both sides, sessile or short-petioled: corymbs mostly with 4–10 heads: peduncles slender, glandular-pilose: bracts of the involucres narrowly linear or narrowly linear-lanceolate, 8–10 mm. long, scarious-margined, acute: rays yellow: pappus silvery white: achenes spindle-shaped, 4.5 mm. long, sharply ribbed, granular.

In sandy soil, Florida. Spring.

Related to *Hieracium Gronovii*, but with a habit suggesting that of *H. Marianum*. In place of a narrow panicle we find a corymbose inflorescence. The heads are much larger than those of *H. Gronovii* as are also the involucral bracts. The achenes are much larger and surmounted by a silvery-white pappus which is longer than the tawny pappus of *H. Gronovii*.

The type specimens were collected by Mr. Geo. D. Hulst, at DeLand, Florida, in March 1891. Other Florida localities are: Tampa Bay [*Leavenworth?*]; St. Marks, May, 1843, *Rugel;* Mayport and Jacksonville, 1870–76, *Keeler*.

III.—NEW SPECIES OF WOODY PLANTS.

HYDRANGEA CINEREA.

A spreading shrub, 1–2 meters tall, with deep green foliage. Leaves opposite; blades thinnish, oval, elliptic, narrowly ovate or

orbicular-ovate, 6–15 cm. long, acuminate, serrate, obtuse, rounded or cordate at the base, bright green above, gray tomentose and not reticulated beneath; petioles somewhat more than ½ as long as the blades or shorter: corymb 5–15 cm. broad, rather round topped: sterile flowers commonly present: calyx campanulate; tube ribbed; segments triangular, acute: petals 5, ovate, boat-shaped, 1.5 mm. long, hooded at the apex: stamens conspicuously exserted: capsule urn-shaped, about 2 mm. in diameter, usually higher than broad, strongly ribbed, tipped by the 2–3 spreading styles.

Western slopes of the Allegheny Mountains, Tennessee and Georgia. Spring and summer.

This shrub stands between *Hydrangea arborescens* and *H. radiata* but is distinguished from either by the gray tomentum of the lower surface of the leaves.

The following specimens belong here:

Tennessee: Chilhowee Mountains, June, *Curtiss*, Number 833; White Cliff Springs, June 24, 1890, *Scribner*, July, 1894, *Kearney;* Chilhowee Gap, Blount County, June 24, 1893, *Kearney*.

Georgia: Ringgold, August 6–12, 1895, *Small*.

PRUNUS INJUCUNDA.

A shrub or tree of a somewhat straggling habit, seldom spiny, clothed with a dull dark-gray bark which on the younger branches is covered with a fine pubescence of a velvety texture. Stem 5–8 meters high, with a maximum diameter of 2 dm.; branchlets ascending or erect, the youngest flexuous: leaves 2–6 cm. long, 1–3 cm. broad, blades oval or obovate, acute or somewhat acuminate, finely but sharply serrate (the teeth apiculate), acute or acuminate at the base, conspicuously and densely pubescent beneath, inconspicuously pubescent and slightly rugose above; midrib very prominent, its lateral branches less so: petioles .5–1 cm. long, pubescent: drupe oblong, 10–13 mm. long, dark purple, clothed with a lighter bloom: stone ovoid, 8–10 mm. long, much compressed, pointed at both ends, crested and grooved on each side of the crest, also grooved on the opposite side.

In sandy soil on the granite districts about Stone Mountain, Georgia. First collected by the writer on July 7, 1893, at the base of Little Stone Mountain.

Heretofore confused with *Prunus umbellata;* it has, however, a

more rigid habit and the foliage, including the branchlets, is velvety-tomentose. In place of the subglobose drupe of *P. umbellata*, we find an oblong fruit of an extremely bitter taste. The stone is correspondingly lengthened.

IV.—A NEW GENUS OF PARONYCHIACEAE.

In that peculiarly formed and little explored region of southwestern Georgia and adjacent Florida, there grows a unique plant which has posed in an unstable manner in both the genera *Paronychia* and *Siphonychia*. It is clear that Dr. Chapman, in dealing with the plant, was more or less dissatisfied with the disposition he made of it, for in one edition of his flora we find it in *Paronychia*, while in another he has assigned it to *Siphonychia*. In fact the species possesses characters sufficient to establish it as a distinct genus. A prominent character is the peculiar involucel subtending the calyx.

FORCIPELLA.*

Annual or biennial pubescent herbs. Stems erect, simple below, forking above, the ultimate divisions ending in cymes. Leaves opposite, narrow, sessile. Cymes many-flowered, rather dense. Flowers perfect, inconspicuous, 2–3 in an involucre composed of two bracts and their broad 2-parted stipules, each, or only 2 seated in a hard, clamp-like involucel, whose two lobes are notched. Calyx of 5 linear-subulate distinct (sometimes cohering at the base) sepals. Petals none. Stamens inserted about the middle of the sepals. Ovary 1-celled, sessile. Style simple, very long and slender. Utricle included, ovoid.

FORCIPELLA RUGELII (Chapm.).

Siphonychia Rugelii Chapm. Fl. S. States 47. 1860.

Paronychia Rugelii Shuttl.; Chapm. Fl. S. States, 47. As synonym. 1860.

Annual or biennial, rather slender, finely pubescent. Stem erect, 1–5 dm. tall, forking, finally diffuse: leaves thickish, oblanceolate, or the upper linear-oblanceolate, 1–3 cm. long, acute, pubescent on both sides, ciliate, sessile: bracts of the involucres linear-subulate, their stipules ovate, acutish or short-acuminate, denticulate: calyx 3 mm.

* Diminutive of *forceps*, referring to the clamp-like involucels.

long, pubescent below the middle, erect in the whitish clamp-like involucel; sepals linear-subulate, acutish, erect, slightly involute: stamens included: style about equalling the sepals in length: utricle ovoid, tipped by the slender style: seeds lenticular, about 1 mm. broad.

In sandy soil and on sand hills, southwestern Georgia and adjacent Florida. Summer and fall. The species has been collected as follows:

Florida: Barren sandhills, October, *Chapman.*

Georgia: Bainbridge, *Chapman;* October, 1869, *Curtiss,* number 345.

A new Southwestern Rose.

By E. O. Wooton.

(Plate 335.)

The species here described and figured is particularly interesting as being the second member of a heretofore monotypic section of the genus *Rosa*—the Minutifoliae of Crepin. * While agreeing in most particulars with the characters there ascribed to this section, it can hardly be said to have appendiculate outer sepals, nor is the pubescence of the receptacle long.

While closely related to *Rosa minutifolia* Engelm., it is easily separated from that species by its less numerous and larger hips with fewer and smaller spines. The stellate trichomes, referred to in the name I have given it, are most unique and interesting in this genus.

As an addition to the known wild roses it is of especial interest on account of the size and beautiful coloring of its flowers. It seems well worthy of cultivation.

Rosa stellata.

Shrub, 4–6 dm. high, much branched. Stems stiff, beset with numerous straight or slightly curved yellowish spines, young stems closely covered with stellate trichomes which may be scale-like or have a central gland-bearing axis, or this axis may be a well developed spine: leaves small, 1–2.5 cm. long, 3–5-foliolate; leaflets triangular, 5–7 mm. long and almost as broad, cuneate, apex truncate or slightly rounded, cut into 5–8 large rounded but acute teeth, one sinus frequently reaching to the middle of the leaflet; stipules oblong, 5–7 mm. long, obtuse, spreading, adnate for about half their length, entire or with 1–2 rounded teeth; leaflets, petiole and stipules covered with a fine spreading silky white pubescence, not glandular: flowers large and showy, solitary, 4–7 cm. in diameter, terminal, deep rose-purple; pedicel short, 1 cm. or less long, stout; calyx-tube globose, 6–8 mm. in diameter, very finely pubescent and covered with numerous spines: pedicel, calyx tube and spines generally purplish tinged; limb of calyx ovate-lanceolate, 1.5–2 cm. long, 5 mm. broad at

* Bot. Gaz. 22: 32. 1896.

base, white woolly within, persistent and connivent in fruit, generally laciniately 2–3-lobed, lobes slender, broadened at apex, entire or serrulate, glandular along the margin; petals broadly obovate, 2.5–3 cm. long, 2–2.5 cm. broad, truncate, outer margin repand; stamens numerous, 5 mm. or less long; filaments slender, glabrous; anthers versatile, elliptical, with cordate-reniform base and emarginate or retuse apex, dehiscent by marginal slits, introrse; pistils many, 5 mm. long, covered with stout fuscous hairs; ovary short-stipitate, stipe attached at one side of median line; style rather stout; stigma capitate, oblique; fruit irregularly spheroidal, spiny, 1–1.5 cm. in diameter, reddish brown; achenes numerous, oblong or elliptic cylindrical, brown, glabrous.

First collected in flower near the Cueva in the Organ Mountains, New Mexico, April 30, 1893, on a dry rocky hillside at an altitude of about 5500 feet. Collected again at the same place with immature but dried up fruit July 10, 1897 (no. 126), and in the White Mountains, Lincoln County, July 22, 1897 (no. 193), two miles west of the Mescalero Agency at an altitude of about 6000 feet. A single specimen collected in August, 1897, on the Fresnal in the Sacramento Mountains, N. M., at an altitude of something over 6000 feet was kindly given to me by Miss M. C. Eaton, of Roswell, New Mexico, who told me that it was very abundant where she had found it, often forming large patches acres in extent and producing a beautiful appearance.

There is some considerable variation in the specimens collected at the different localities, those from the higher altitudes being more vigorous (generally 10–12 dm. high, with larger leaves), more glandular, more spiny and less pubescent. The description above applies to the plant first collected except in the fruit. Specimens with ripe fruit from this locality I have not seen, but I have here described the fruit of White Mountain plants.

The Organ Mountain specimens are closely lepidote on all the branches of the year and these trichomes, which are not usually spiny, persist on branches that are two years old. The leaves are as described, finely pubescent and not at all glandular, and the leaflets perfectly triangular. Specimens from the White Mountains show all grades of stellate scaliness from closely so on the branches of the year, to only slightly so immediately below the flowering peduncles. Old stems are rarely lepidote and all are much more

spiny, the stellate trichomes being replaced by numerous fine recurved spines. The leaflets of these specimens vary from triangular to obovate, and from finely pubescent to perfectly glabrous. The teeth are generally more numerous and the margin is more or less supplied with sessile glands.

The Fresnal specimen is perfectly glabrous on leaves and stems, but the stems are very spiny and bear numerous stipitate glands, while the margins of the leaflets and stipules are very glandular; the leaflets are usually five in number and obovate. The absence of stellate trichomes, the more numerous spines, the generally more numerous, larger, and differently shaped leaflets, and the glandular character of this plant would seem to be sufficient to establish a well marked variety at least, but the material examined seems to me to be too scanty to warrant such action.

Explanation of Plate 335.

Rosa stellata Wooton.

FIG. 1. Branch showing bud and flower, natural size. Organ Mountains.
FIG. 2. Young growing branch, natural size. Organ Mountains.
FIG. 3. Single leaf, natural size. Organ Mountains.
FIG. 4. Section of flower, natural size. Organ Mountains.
FIG. 5. Stamen and pistil, × 4. Organ Mountains.
FIG. 6. Leaf and spine, natural size. White Mountains.
FIG. 7. Fruit, natural size. White Mountains.
FIG. 8. Achenes, × 2. White Mountains.
FIG. 9. Three forms of trichomes, magnified.

Three Editions of Marcy's Report on the Red River of Louisiana.

By Frederick V. Coville.

My attention has been recently called by Mr. J. W. Blankinship to the fact that there are in existence three editions of Captain Randolph B. Marcy's report entitled "Exploration of the Red River of Louisiana in the year 1852."

Of the three editions one was published in the year 1853 as Senate Executive Document No. 54, 32d Congress, Second Session. Both the other two editions were published in 1854, one as a Senate Executive Document, without number, 33d Congress, First Session, the other as a House Executive Document, without number, 33d Congress, First Session. For convenience these editions may be referred to repectively as Senate, 1853; Senate, 1854; and House, 1854.

All three editions contain Captain Marcy's own report followed by eight appendices of which the seventh, appendix G, consists of the botany of the expedition by Dr. John Torrey. Plates numbered from 1 to 20 accompany the botanical report and in all three editions plate 18, which, according to the explanation of plates, should be *Abronia cycloptera*, is missing. There is nothing in the text of any of the editions to suggest the reason for this omission; for though *Abronia cycloptera* is not mentioned in the body of the appendix the same is true of *Geranium Fremontii, Xanthisma Texanum*, and *Heliotropium tenellum*, all of which, however, are figured.

The Senate 1853 edition is clearly, as its date and its sequence in the Executive Documents would indicate, the one first published, the publisher according to the title page being Robert Armstrong. The plates accompanying the botanical report were lithographed by Ackerman of New York, as was also the principal map accompanying the report. The botanical appendix, exclusive of its half title and Dr. Torrey's letter of transmittal, begins on page 280 and extends to page 302, followed by an explanation of the plates.

The House 1854 edition, which probably appeared before the Senate 1854 edition, bears on the title page the name A. O. P. Nicholson, as the publisher, while the lithograph plates of the botanical appendix, as well as the map, were made by Lawrence, of New York. The main part of the narrative is set up in type of precisely the same size as that used in the Senate 1853 edition, but it is clear from the lack of uniformity in broken letters, an occasional letter from a wrong font, and a running forward or backward of single words or single lines that the matter was all reset. The pagination however, as far as page 117, the end of Captain Marcy's own report, is the same. Beginning with page 118 the meteorological tables, etc., were set up in different type so that a conspicuous difference in the pagination follows. Dr. Torrey's botanical appendix, exclusive of the introductory matter, begins on page 248 and extends to page 270, followed, as in the other edition, by the explanation of plates. It is clear that the copy used in setting up this second edition was not the original manuscript, but consisted of the printed pages of the earlier edition. For practical purposes all citations of the botanical portions of the two are identical with the exception that in the House 1854 edition the corresponding pages are numbered 32 less than in the Senate 1853 edition, page 280 corresponding to page 248, and so on throughout. The lithograph plates of the House 1854 edition are perhaps slightly inferior to those of the 1853 edition.

The Senate 1854 edition differs somewhat more from the other two, but the differences are almost wholly typographical. The publisher, according to the title page, was Beverly Tucker. The botanical lithographs and the map, as in the Senate 1853 edition, bear the name of Ackerman. Captain Marcy's narrative is set up in larger type than either of the earlier editions and occupies about ten pages more. The botanical appendix is set up, on the other hand, in smaller type than in either of the other editions and extends, exclusive of introductory and supplementary matter, from pages 267 to 289. In general the corresponding pages contain the same matter as in the other editions, but in a few cases from one to several lines are run backward or forward upon the adjacent pages. From the internal evidence furnished by occasional typographical differences it is clear that the printed pages of one of the

other reports, probably the House 1854 edition, was used as printers' copy.

The differences in the botanical appendices in the three editions are such as would be made by a typographer or a non-botanical proof-reader. It is evident that proof of the two later editions did not go through Dr. Torrey's hands. For purposes of consultation, so far as the subject matter is concerned, therefore, any one of these editions is equally valuable, the only difference of importance being that of pagination. Fortunately it is the true first edition, that is, the Senate 1853 edition, which has usually been cited in botanical publications, including the Botany of the Mexican Boundary Survey, Gray's Synoptical Flora, Watson's Bibliographical Index, and the Index Kewensis. Indeed, I have seen no published citations from either of the two later editions.

This report is a good illustration of the wasteful methods pursued in the publication of government reports before the establishment of the present Government Printing Office. The three editions of this report were published by as many different firms, the type was set up three times, and the government therefore paid thrice the normal cost of composition work. Under the present system the printing of all three editions would have been done under one roof, and electrotypes would have been used for the two later editions, thus reducing the cost of composition by two-thirds.

Mycological Notes.

By Byron D. Halsted.

The Checking of Hollyhock Rust.—There was rejoicing in the Plant Hospital over one fungus that appeared there late in autumn for the first time. For two years it has been watched for and the plants treated to sprayings in anticipation of its advent.

The year 1889 may be set down as the time when the hollyhock rust (*Puccinia malvaceavum* Mont.) made its appearance in a general manner in the United States. This is one year in advance of the outbreak of the carnation rust (*Uromyces caryophyllinus* Schr.) which came generally to the notice of the florists in 1890, and has remained as a serious menace ever since. In like manner 1896 is the year in which the asparagus rust (*Puccinia asparagi* DC.) came to us in a violent form and without any abatement during the past year. All three of these genuine rusts had been previously known in Europe for a long time, and came to us in a way that is not yet not fully understood.

But to return to the hollyhocks, it may be written that a row of plants were grown from seed and when three months old were set in the experiment area, and certain ones sprayed and others not, all through the growing season of 1896 without a single sorus of the rust appearing upon any plant either check or sprayed.

In passing it may be recorded that there was a large amount of the leaf spot (*Cercospora althaeina* Sacc.) and reward for the treatment was ample, for the fungicides worked admirably and kept the sprayed plants comparatively clean. During 1897 similar results were obtained for the fungicides with the *Cercospora*, but, best of all, the enemy for which the plants were set to catch appeared in October. It is worthy of remark that it came no earlier than this, the plants being closely watched. When first discovered the sori were quite young, but they increased rapidly in number, and soon became mature. The chief fact to be here recorded and to which all that has preceded is somewhat introductory is, that of the eighteen plants that were sprayed

only one showed the rust at all, while all of the untreated plants were more or less badly rusted. Here is an instance where spraying proved very effective against such a rapidly developing and deeply seated enemy as the hollyhock rust. The sprayings were made at intervals of about ten days varying somewhat and depending upon the weather.

Observation in Wind-infection of a Rust.—An instructive instance of one-sided infection was observed the past season in connection with the asparagus rust (*Puccinia asparagi* DC.). On September sixth, while inspecting asparagus fields in Gloucester County, New Jersey, the writer came to a field with quite an unusual green appearance, nearly all the fields being brown and lifeless so far as the brush was concerned, having been killed by the remarkable ravages of the rust fungus. The field in question had been cut over and the very rusty brush removed about five weeks before, with the hope that the new growth might escape the ravages of the *Puccinia*. At the date of the inspection the brush was about hip high and showing the rust only upon one side of each plant. So strikingly one-sided was the output of the rust sori that one could scarcely fail to observe it. Every main stem was almost completely covered with the rust upon one side, while the opposite bore almost no spots. It was also noticed that this rusted side varied somewhat at different ends of the long field, and at all points was at right angles to lines drawn from an old and very badly rusted bed of asparagus that stood with its end toward the broad side of the field in question and about forty rods away.

This observation teaches something concerning the rapidity of the development of the rust fungus. As the brush must needs have been developed to some extent before the uredospores could have alighted upon them, and also it is fair to judge that many of the sori upon the plants were fully ten days old, and, therefore not more than two weeks might have elapsed from the time when the spores came to the asparagus plants to that when sori were giving off their spores. The season was unusual, July being a very rainy month, and the long wet spell continued into August, followed by hot, moist weather particularly favorable for the development of fungi.

That the source of infection was the old asparagus bed is beyond question. About midway between the two beds stands a house and a few trees around it, and it was observed that there was less rust upon that portion of the new bed that was in line with this house and the old bed. In short, there was a barrier between the old bed and the new that interfered with the free passage of the spores. When the surface of the rusted stems of the old bed were dry and the winds blew from it towards the new bed, the spores were doubtless carried in great abundance, and these spores alighting upon the tender stems of the young shoots, encouraged by hot dewy nights, quickly germinated and rusted the plants. There is no reason to doubt that some of the rust spores were carried by the winds to long distances and infected plants miles from where they were produced.

A close Relation between Rainfall and Potato Rot.—The year 1897 had its counterpart in that of 1889. During the past ten years there have been in the Eastern States two Julys noted for their excess of rainfall as shown in the following averages of rainfall for New Jersey during the past ten years:

Year	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	Average
Rainfall	3.50	**10.19**	5.62	5.30	4.03	2.72	1.66	4.24	5.50	**11.42**	5.42

It is seen that in July, 1889, there was nearly double the average rainfall, and this amount was exceeded during the same month of last year.

In 1889 there was an unusual outbreak of potato rot, and both *Phytophthora infestans* D.By., and the bacterial disease working alone or together carried off a large portion of the potato crop. Large growers throughout whole sections of the country did not harvest their potatoes at all. Others dug them and after they were placed in heaps the rot worked their complete destruction.

Similar results have obtained in the potato fields the past year, and the writer recalls visiting some of the leading potato growing regions, only to review the scenes of 1889 and listen to the same story of heavy rains and destructive decay.

There have been seven Julys since 1889 that were either normal or comparatively dry, and during that time potato growers

have not complained of the rot. I do not remember of finding *Phytophthora* at all destructive during the period from 1889 to 1897; but the last season it was so abundant upon the experiment plots that the crop of potatoes was harvested unusually early to make sure of results in other directions. Nearly every leaf upon every plant showed first the frosty coating followed in a day or two with the wilting of the leaves.

It seems to me that the *Phytophthora* or late blight is quite dependent upon an abundance of moisture in midsummer, and if this relation is noted sufficiently the time may come, it may be predicted with reasonable certainty, that a wet July will mean a decaying potato crop, unless some successful method of checking this rapidly developing fungus is employed, and, contrariwise, a dry midsummer will insure freedom from its ravages.

The Phytophthora of Lima Beans.—In connection with what has been said above-concerning the influence of copious rainfall upon the unusual development of the potato rot fungus it is in order to report that another member of the genus *Phytophthora* has been complained of bitterly during the season of 1897. The mildew of the lima beans, *Phytophthora phaseoli* Thax., is a comparatively new one, having been described by Dr. Thaxter only eight years ago* and figured in the Annual Report of the Con-

* Botanical Gazette, 14: 273. N. 1889.

necticut Experiment Station for 1889, when it is stated that it was first noticed in September of that year, and in some cases a large portion of the crop was destroyed.

Particular emphasis is placed upon the date of the discovery and the fact that it was very abundant at the time it was taken, because that was the year in which the three months of July, August and September gave a total rainfall of 2.733 inches for New Jersey, and presumably as wet in Connecticut, which is 9.54 inches more than the average of those three months for the past ten years. Since 1889 the *Phytophthora* has been scarcely heard of until the present season when it has been as above stated so prevalent in some fields as to ruin the crop.

A fair sample of a diseased pod is shown in the engraving where the enlargement is double the normal size of all the parts. The mildew has a particular fondness for the pods and will attack them soon after flowering; in fact it was not difficult to find the whole inflorescence covered with the conidiophores before the first flower had come into bloom. The engraving shows also the general habit of the *Phytophthora* upon pods of two inches in length, in that it frequently makes its attack near the middle of the dorsal margin, and from there spreads over the pod towards the end and ventral suture and makes its densest growth of hyphae over the young seeds from which the needed nourishment is doubtless extracted abundantly.

December 15, 1897.

Proceedings of the Club.

WEDNESDAY EVENING, NOVEMBER 24, 1897.

President Brown presided, and 11 persons were present.

The first paper of the evening was by Mr. Marshall A. Howe, "The Genus *Anthoceros* in North America," and was illustrated by drawings and specimens. The paper which will soon appear in print, described three new species and reviewed the species before recognized of which latter two only occur in the Gray's Manual region, *A. laevis* and *A. punctatus*. Mr. Howe also indicated the intermediate position of *Anthoceros* between the Hepaticae and Musci, and discussed its increased sporophyte-development, looking upward toward the Pteridophyta. The life-history of *Anthoceros* was illustrated by figures, beginning with the roughened yellow or blackish spore.

By C. F. Austin, the cognate genus *Notothylas* was united with *Anthoceros;* but it lacks stomata and differs in its capsule form, direction and position. Austin's herbarium was sold in England, and now belongs in part to the bryologist Pearson, and in part to the Owens College, Manchester.

Discussion by President Brown and others followed. Dr. Underwood remarked that he had known *Notothylas* spores, unlike those of *Anthoceros*, to germinate without resting-period. *Anthoceros laevis* he finds among the hemlocks at the Botanical Garden, and elsewhere in moist, flat, sandy and grassy land, fruiting August to November. In California, said Mr. Howe, they occur on banks and in springy places, beginning to fruit in February and shrivelling in May. One of the species of the Californian coast formerly confused with the *A. caespiticius* of De Notaris, is found by Mr. Howe to develop curious globose storage-bodies, serving as food reservoirs to carry the plant over the dry seoson.

The second communication was by Dr. T. F. Allen, entitled "Contributions to the Japanese Characeae," composed in fact of four papers, soon to be printed, descriptive mainly of certain Japanese *Nitella*-forms displaying interesting correspondences with our

own. Dr. Allen then proceeded to exhibit numerous mounted specimens and etchings, and spoke of the taxonomic characters. Spore-characters though important are not to be relied on exclusively. Measurements of any one species prove very constant. In some the form of the mucro terminating each ray is decisive. The spores afford specific characters both by their arrangement and their markings, as shown by a $\frac{1}{12}$ or $\frac{1}{15}$ immersion lens. Their reticulations are very constant. The spirals which invest the spores are very early formed, from the five bracts which form a cup about it and soon become spirally twisted, as all parts of the Characeae do, and as the protoplasm current does even before its cell has becomes twisted. Discussing their life-history, Dr. Allen said that the Characeae increase in part by nutrition dependent on absorption of their radicles. If these short unicellular radicles are broken in collecting, the plant will finally die after the lower cells have yielded up their contents toward the maintenance of the others. *Chara coronata*, the finest of all in showing circulation, survived in his aquarium half a year without any rooting. *Nitella flexilis* will, however, root in the aquarium, produce spores, germinate and make a protonema which divides immediately into an upward ray-bearing axis and a descending root-bearing portion.

TUESDAY EVENING, DECEMBER 14, 1897.

President Brown in the chair, and 15 persons present.

The Secretary read the reply of the Board of Trustees of the College of Pharmacy to his letter of October 28, 1897, requesting for the Club the privilege of holding its meetings at that College. The reply, dated December 3, 1897, stated that "by a unanimous vote of the Board your request for the use of our rooms for meeting purposes was granted." Thos. J. MacMahan, Chairman of Curators.

Mr. Charles J. Saunders, of Philadelphia, Pa., was elected an active member.

Dr. Britton proposed to amend Section III. of the Constitution by the substitution of the word "seven" for the word "five" in line 4, so as to read, "Associated Editors not to exceed seven in number."

President Brown appointed a special committee to consider this proposed amendment Dr. Britton, Dr. Underwood, Dr. Rusby and the Secretary.

Judge Brown announced the members of the Committee on Program for 1898 as follows: Dr. Rusby, Mrs. Britton, Dr. C. C. Curtis.

The first paper, by Prof. Francis E. Lloyd, "On an Abnormal Cone of *Pseudotsuga mucronata*," discussed the structure of a cone recently observed on a leader of the Douglas Spruce. He figured and described certain lateral expansions of the bracts, remarking on their possible stipular nature.

Remarks were made by Judge Brown, Dr. Britton, Dr. Rusby, Mr. Howe and Dr. Underwood.

The second paper, by Mr. E. O. Wooton, "Botanizing in New Mexico during the Summer of 1897," gave an entertaining and graphic narrative of this collecting trip made by Mr. and Mrs. E. O. Wooton in Doña Ana and Lincoln Counties, N. M., in last June, July and August. The route extended from the Rio Grande valley at Mesilla near the Mexican line, at an elevation of 3900 feet, to Sierra Blanca Peak, at 11000 feet. Special interest attached to the collections made from the southern end of the White Sands, a region about 30×6 miles or more in area, not before explored by a botanist, except that a half dozen plants had been gathered on its margin by Prof. T. D. A. Cockerell, of Mesilla. This vast expanse of sand, seeming like a sea of white, is moving slowly to the east. Even its lizards are white. Several new grasses were obtained here, and other very peculiar species. Very extensive collections were made in this trip, though with great hindrance from the summer rains.

Discussion brought out the great dissimilarity existing between neighboring floras in New Mexico. Mr. Wooton's collections numbered about 600 species. Mr. A. A. Heller, collecting meanwhile about 250 miles northward, among 300 numbers had but about 50 duplicates of these, and Dr. Rusby collecting some time ago at a similar distance west, among 450 species duplicated only about the same number.

ANNUAL MEETING, JANUARY 10, 1898.

President Rusby presided, and there were 22 persons present.

The favorable report of the committee to consider an amendment to the Constitution followed. The Secretary announced the change proposed, viz. to substitute "seven" for "five" in line 4 of Article 3 of the Constitution; thus increasing the number of associate editors from five to seven.

The annual reports of the officers and of the standing committees were tendered as follows:

The Treasurer, Mr. Ogden, reported a cash balance on hand of $116.93 in the general fund and $532.28 in the Buchanan fund.

The Recording Secretary, Prof. Burgess, reported an average attendance of 35 at the 15 meetings held during the year, one death, a present active membership of 213, corresponding membership 153, honorary membership 4, total 370. The 30 scientific papers presented have included many taxonomic subjects, and a good proportion of physiological, cryptogamic and morphological topics.

The Editor, Dr. Britton, reported the regular monthly publication of the BULLETIN, including 592 pages, 33 plates and one portrait; and the publication of Vol. 6, No. 2 of the *Memoirs*, containing 80 pages; issued July 30, 1897. The Editor also reported a cash balance remaining to the credit of the BULLETIN.

The Curator, Miss Ingersoll, reported valuable additions to the herbarium from Ulster county, and exhibited a completed list of desiderata prepared in accordance with the resolution of the Club of January 12, 1897.

Dr. Small reported for the field Committee, that field meetings were arranged for every Saturday from April 24 to October 30, and also on election day; 29 excursions in all. These were usually half-day excursions, with four for the whole day, and four of two days each. They have extended into the neighboring mainland of New York, into Long Island, Staten Island, New Jersey and Pennsylvania. The average attendance upon the excursions was about 16, and the average number of plants specially recorded 48.

Dr. Rusby, in behalf of the Committee on Program, announced

arrangements in progress relative to presentation of several interesting topics before the Club by botanists from other cities.

One active member, Dr. C. O. Townsend, and one corresponding member, Dr. Arthur M. Edwards, were elected.

Next followed the annual election, resulting in the reëlection of the previous officers with the exception of the editor, treasurer and librarian, who declined reëlection. L. M. Underwood was elected editor; F. E. Lloyd and C. C. Curtis, associate editors; M. L. Delafield, jr., treasurer, and P. A. Rydberg, librarian. The remainder of the meeting was devoted to the presentation of miscellaneous notes.

Professor Lloyd spoke of the work of Professor L. H. Bailey upon the origin of the cultivated strawberry and tomato, and exhibited specimens to indicate that *Fragaria Chilensis* is the source of the cultivated strawberry. He also exhibited the original specimen of the strawberry known as the Hovey, and a series of specimens indicating the development of varieties of the tomato.

Dr. Rusby spoke of his experience with the *Fragaria Chilensis* as cultivated in the Bolivian Andes, where, at 10,000 feet altitude its growth is luxuriant, standing up nearly to the knees. Its fruit is large and juicy, does not keep well, and is without flavor or fragrance. Its identity with the coast form was questioned by Dr. Britton.

Dr. Rusby also exhibited a sample of *Fragaria Mexicana* by some identified with *F. Chilensis* and by others with *F. vesca*, but which keeps well and is highly flavored.

EDWARD S. BURGESS,
Secretary.

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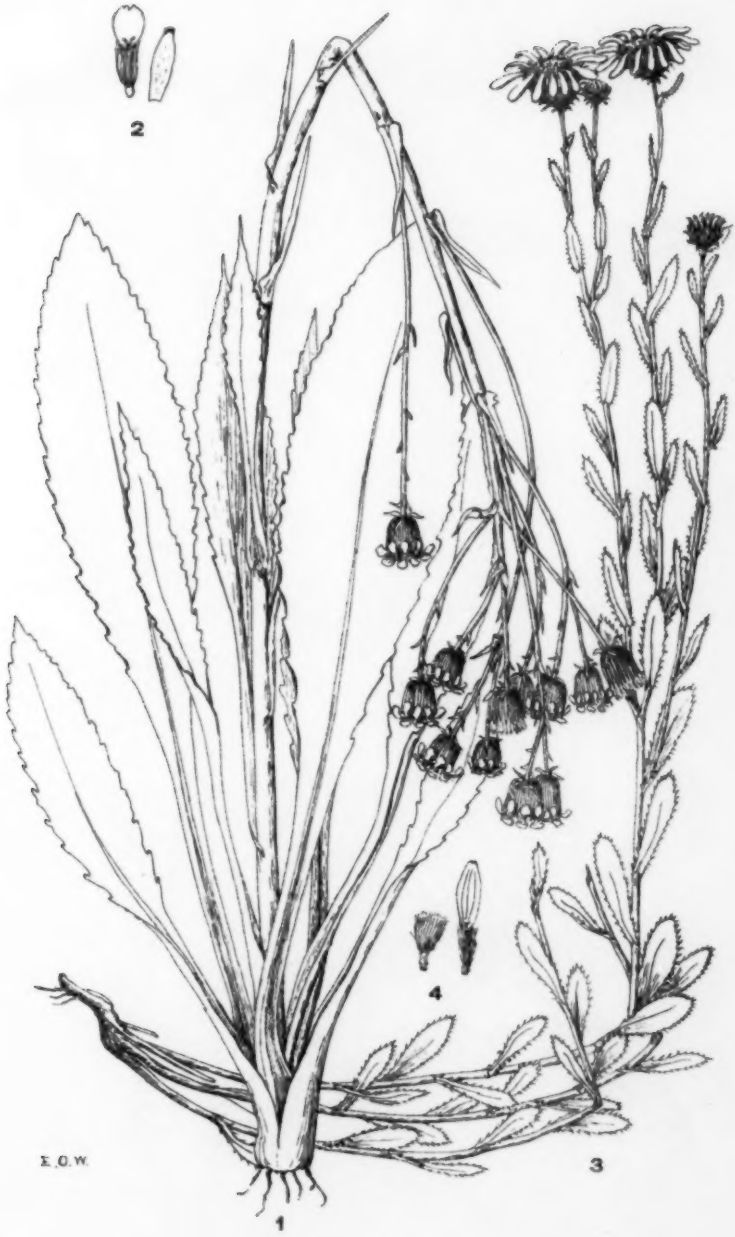

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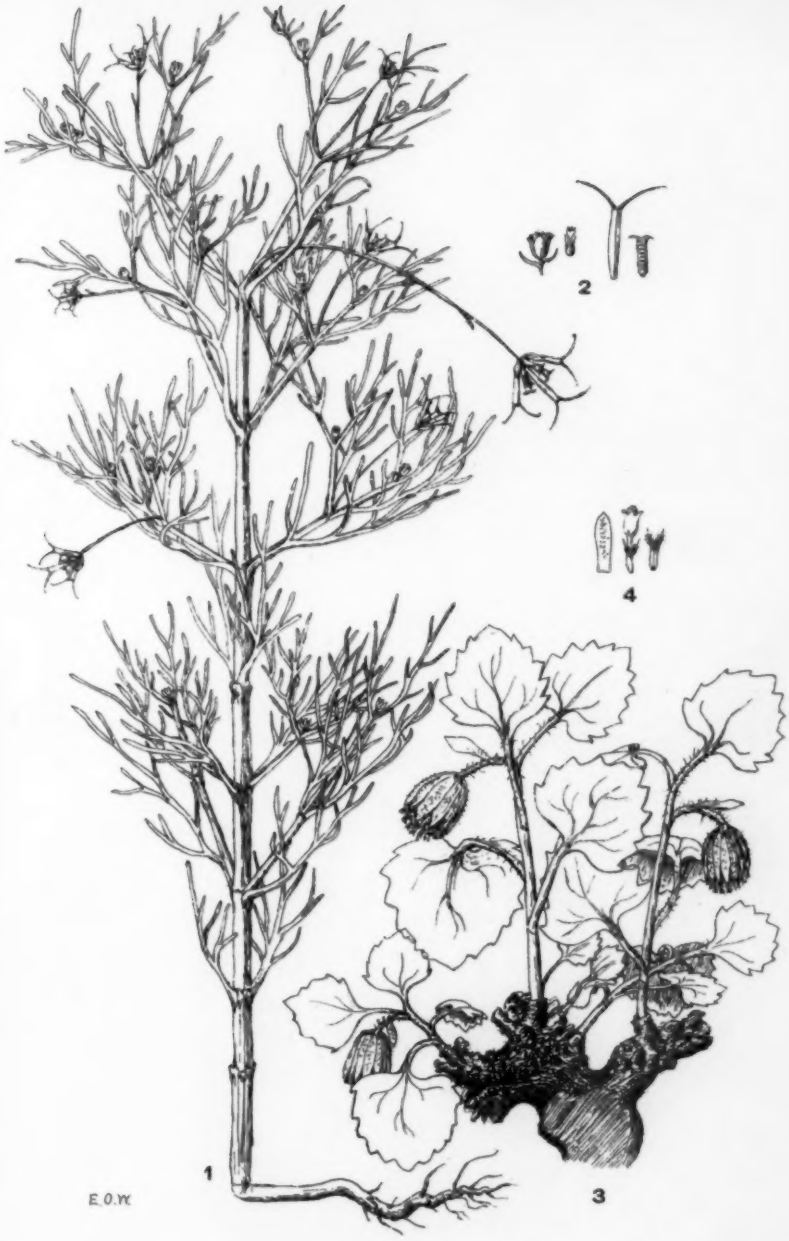

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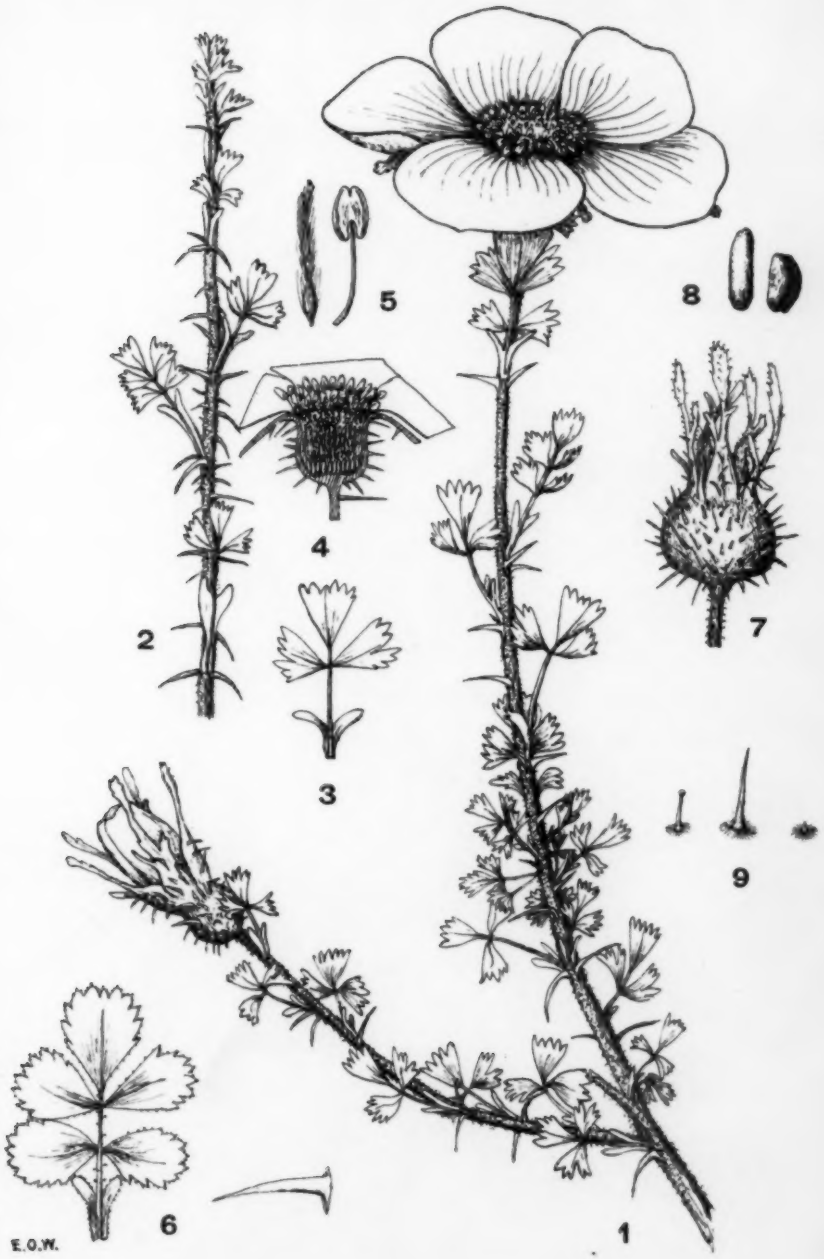

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